eFilm Lite™ 3.2 User's Guide

Veterinary

MERGE™ Healthcare

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Merge OEM
6509 Airport Road, Mississauga, ON, Canada L4V 1S7
Tel: +1-905-672-2100 • Fax: +1-905-672-2307
Toll-free in North America: 1-800-724-5970

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Considerations prior to use

The software is not intended to replace the skill and judgement of a qualified medical practitioner and should only be used by people who have been appropriately trained in the software's functions, capabilities and limitations.

The user should be aware of the limitations in the accuracy and correctness of the output data displayed on the screen, printed, or exported from eFilm. The quality of the data is dependent on the correctness of the input data, the user's interaction with the data, the quality, characteristics, and settings of the display device or printer, and the necessity to interpolate the data for display purposes. For example, measurement values in eFilm are dependent on the calibration information provided by the modality in the DICOM header.

While eFilm and eFilm Lite have been tested extensively, it is impossible to completely test any piece of software, and errors may remain in the software. It is possible that an error could manifest as an incorrect measurement or image. Users must be aware of the potential for errors.

eFilm saves images together with patient information, both when saving to the local database and when exporting from eFilm. It is important to protect this data from access by unauthorized persons.

Users should be aware that certain views make use of interpolated data. This is data that is created by eFilm or eFilm Lite based on the original data set. Interpolated data may give the appearance of healthy tissue in situations where pathology that is near or smaller than the scanning resolution may be present. On occasion, interpolated data may also include image artifacts which should not be interpreted as real pathology.

The image scrapbook function is intended to preserve annotations on images. Scrapbooked images should not be used for primary diagnosis.

Table of Contents

Chapter 1 eFilm Lite Overview

System requirements 1
eFilm Lite window 2
Using the toolbar 3
- Moving the toolbar 3
- Customizing the toolbar 3
- Accessing the Mini Bar 4

Using tools 4
- Main tools 5
- Common tools 5
- Next/Previous tools 6
- Measurement tools 6
- Multiplanar tools 7
- Image Manipulation tools 7
- Volume tools 8

Chapter 2 Setting User Preferences

Customizing modality settings 9
- Changing modality layouts 9
- Customizing advanced user settings for a modality 10

Customizing system preferences 13
Using image markers 13
Customizing volume settings 15
Customizing template settings 17

Chapter 3 Viewing Images

Using the eFilm Lite viewer 19
- Customizing the eFilm Lite viewer 20

Viewing studies 20
- Arranging study series in panes 21
- Viewing study information 22
- Setting the encryption password 23
- Adjusting the screen layout 23
- Comparing multiple studies 24

Viewing non-DICOM objects 25
Selecting images and series 25
- Selecting images 25
- Selecting series 26

Chapter 4 Navigating Images

Moving through images 27

Using the toolbar to move through images 27
Using the scrollbar to move through images 28
Stacking images 29
Using the Cine tool 29
Moving through series 30
Moving through studies 30
Synchronizing series 30
Synchronizing series automatically 31
Synchronizing series manually 31
Locating points in 3D space 31

Chapter 5 Manipulating Images

Setting window/level values 33
Adjusting window/level settings manually 33
Using window/level presets 35
Using non-linear (sigmoidal) window leveling 36
Setting alpha and beta values 36
Inverting images 36
Overlaying reference lines 37
Changing image orientation 39
Adjusting image viewing options 39
Panning 40
Magnifying 40
Zooming 41
Resetting the original image settings 42
Adjusting series viewing options 42
Exploding series 42
Using image fusion 44
Fusing images from two-modality image series 44
Adjusting the Alpha setting 45
Configuring the image fusion pipeline 45
Splitting a series 47

Chapter 6 Annotating and Measuring Images

Overlaying text 49
Annotating images 50
Making linear measurements 51
Making elliptical measurements 52
Drawing arrows 53
Displaying angle measurements 53
Copying annotations and measurements 54
Calibrating images 55
Probing images 56
Labeling a Spine 57
Clearing measurements 59

Chapter 7 Creating 3D Images

3D modes 61
Using 3D images 62
Creating 3D images 62
Adjusting loading parameters for 3D volumes 64
Cropping 3D volumes 65

Rotating 3D volumes 66
Viewing 3D images in stereo display mode 67
Using the black outside window setting 67
Adjusting mapping settings for 3D volumes 68
Creating MPR views 71
Creating Orthogonal MPR viewing planes 72
Creating MPRs from 2D images 73
Creating MPRs from 3D volumes 73
Interacting with MPR series 74
Adjusting the MPR view 74
Creating MPR slabs 77
Saving and deleting MPR views 77

Chapter 8 Exporting Images

Copying and Pasting Images 79
Exporting images as graphic files 79
Exporting images to AVI files 80
Exporting volumes to AVI files 81
Printing images 82

Chapter 9 Creating an eFilm Lite CD

DICOMDIR directory structure 84
eFilm Lite runtime files 84

Chapter 1: eFilm Lite Overview

eFilm Lite™ is a more basic version of eFilm Workstation®, which is an application used for viewing and manipulating medical images. Digital images and data from various sources (including CT, MR, US, RF units, computed and direct radiographic devices, secondary capture devices, scanners, imaging gateways, or imaging sources) can be displayed on workstations and laptops using this software. When viewing images, users can perform adjustments of window width and level, image stacking, annotation and measurement of regions of interest, and various image alterations.

In this section, you will learn how to:

- meet minimum system requirements (see "System requirements" on page 1)
- understand the layout of the eFilm Lite workspace (see "eFilm Lite window" on page 2)
- customize the eFilm Lite toolbar and access the Mini bar (see "Using the toolbar" on page 3)
- understand the functions of the tools in the eFilm Lite toolbar (see "Using tools" on page 4)

System requirements

This section describes the hardware and software required to run eFilm Lite.

Required hardware

eFilm Lite must run on a computer that meets the following hardware requirements:

- Pentium II processor
- 256 MB RAM
- Minimum display resolution 800 x 600

When choosing computer hardware, users should note that the most substantial performance gains result when RAM is increased. In order to prevent poor performance of the software, Merge Healthcare does not recommend that eFilm Lite be run on a less powerful system than that listed above.

Required software and operating systems

eFilm Lite requires the following software programs and operating systems in order to operate properly:

- Windows 2000, Windows XP Professional or Windows Vista

Note: Windows 95, Windows 98, and Windows NT are no longer supported by Merge Healthcare.

- Microsoft Internet Explorer (IE) 6.0 or higher

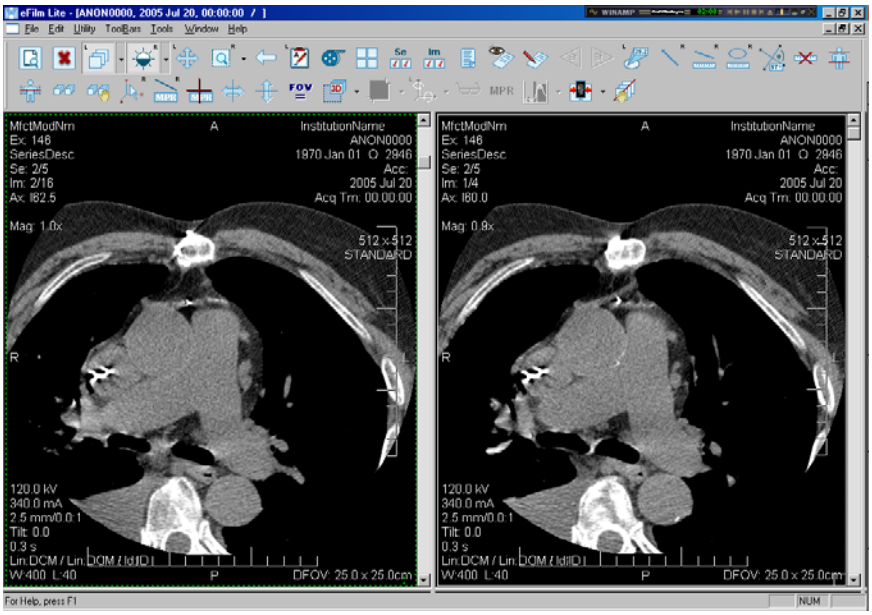
Required hardware for 3D volume rendering

A video display adapter with at least 128 MB of video RAM that fully supports DirectX 8.1 or later.

Refer to the product help files and the Merge Healthcare Web site at www.mergehealthcare.com for the most up-to-date system requirements.

eFilm Lite window

The main *eFilm Lite* window is a workspace where you can view and manipulate DICOMDIR images stored on a CD.



Note: eFilm Lite should launch automatically when you insert a CD with DICOMDIR images burned on it. If it does not launch, navigate to your CDROM directory and double-click **eFilmLt.exe**.

This window can contain more than one image at a time, each in a separate pane arranged in a grid. The menu bar appears at the top of the window, and the status bar will appear at the bottom (if enabled). By default, the tool bar appears at the top of the window directly beneath the menu bar, but you can move it by following the procedure outlined in "Moving the toolbar" on page 3.

Using the toolbar

Additional tools in the toolbar are displayed based on the customized toolbar settings and activated according to the selected modality type.

To view the description of a tool, hold the cursor over its icon. Full descriptions of the tools can be found in "Using tools" on page 4.

In this section, you will learn how to:

- move the toolbar (see "Moving the toolbar" on page 3)
- configure the toolbar (see "Customizing the toolbar" on page 3)
- access the Mini Bar (see "Accessing the Mini Bar" on page 4)

Note: By default, the application displays the minimal toolbar.

Moving the toolbar

The toolbar does not have to remain at the bottom of the window; it can be moved to the top, to the left, or to the right of the window, in order to accommodate your preferences.

To move the toolbar:

- Choose one of the following options:
  - Select the toolbar and drag it to a new location
  - On the **ToolBars** menu, click one of the default locations
  - Right-click anywhere in the toolbar and select one of the default locations

The new location becomes the default for the toolbar.

Customizing the toolbar

There are a number of features available in eFilm Lite that allow you to customize the look and feel of your toolbar. All of these features are accessible via either the **ToolBars** menu or the pop-up menu that appears when you right-click anywhere in the toolbar region.

Note: All tools are also found in the **Tools** menu; however, not all tools listed in this menu are available on the toolbar.

To customize the number of toolbar icons displayed:

- Select one of the following options:
  - **Minimal:** displays only the toolbar icons common to all modalities.
  - **Standard:** displays all of the toolbar icons relevant to the modality of the study displayed in the *eFilm Lite* window.
  - **Full:** displays all of the toolbar icons available in eFilm Lite.

To customize the size of the displayed toolbar icons:

- Select one of the following options:
  - **Small:** displays only the toolbar icons common to all modalities.

- **Medium:** displays all of the toolbar icons relevant to the modality of the study displayed in the *eFilm Lite* window.
- **Large:** displays all of the toolbar icons available in eFilm Lite.

To convert the toolbar icons to grayscale:

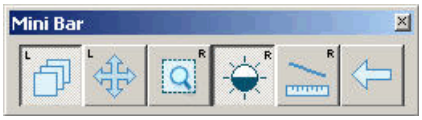
- Select **Grayscale**.

To automatically hide the toolbar:

- Select **AutoHide**.

Accessing the Mini Bar

In addition to the main toolbar, you can also use the Mini Bar for quick access to commonly used tools.



By default, the Mini Bar includes the following six tools: Stack, Pan, Zoom, Window/Level, Measurement Tool - Line and Reset Image Settings. This tool set is predefined; tools cannot be added to the Mini Bar, but if you remove a tool from the toolbar, it will also not appear in the Minibar (i.e., a tool will only appear on the Minibar if it is part of the eFilm toolbar). If the toolbar is customized not to display any of the tools in this set, then those tools will not be displayed in the Mini Bar. All of the tools on the Mini Bar can be assigned to either the left or right mouse button except the Reset Image Settings tool.

To access the Mini Bar:

- Hold the right-mouse button and then click the left-mouse button. The Mini Bar pops up in the area of the window where you clicked both mouse buttons.

Using tools

eFilm Lite includes a large selection of tools to help you navigate and manipulate study images. In this section, you will learn about the tools located on the toolbar. The tools are grouped as follows:

- Main: access studies (see "Main tools" on page 5)
- Common: apply to all modality types, including window/level settings, layout settings, and other image viewing tools (see "Common tools" on page 5)
- Next/Previous: navigate between studies, series, and images (see "Next/Previous tools" on page 6)
- Measurements: measure regions of an image (see "Measurement tools" on page 6)
- Multiplanar: work with MultiPlanar Reformatting (MPR) images (see "Multiplanar tools" on page 7)
- Image Manipulation: rotate, flip, and invert images, and related functions (see "Image Manipulation tools" on page 7)
- Volume: view and manipulate images in three dimensions (see "Volume tools" on page 8)

Main tools

Search	Opens a list of patient studies available for viewing on the CD.

Common tools

Stack	Manually scrolls through images within a series. You may define the sort criterion.
Window/Level	Adjusts the brightness and/or contrast of the image. You may specify whether this is done interactively or via LUTs included as part of an image header.
Alpha (Coherence)/Beta (Black/White Bias)	Adjusts the coherence and/or black/white bias settings of the image.
Magnification	Magnifies the area of interest within the image. You may define the percentage of magnification.
Pan	Repositions the images in the window.
Zoom	Manually increases or decreases the image's field of view.
Reset Image Settings	Resets the original image settings after manipulations, except the window/level settings.
Toggle Overlay	Hides or displays the written study information and scale bar displayed in the window.
Add User Annotation	Allows the user to add and position text in the image.
Cine	Automatically cycles through the images in a series.
Screen Layout	Redisplays series and images in various layouts on the screen.
Toggle Survey/Explode Mode	"Explodes" images to fill the screen and returns to the former layout.
Show Study Information	Displays more information about the patient and study.
Image Fusion	Fuses CT/PT images together.
Label	Allows you to label the vertebrae of a spine using predefined annotations.

Next/Previous tools

	Previous Study	Loads the previous study from the CD.
	Next Study	Loads the next study from the CD.
	Previous Series	Loads the previous series within the selected exam.
	Next Series	Loads the next series within the selected exam.
	Previous Image	Loads the previous image of the series.
	Next Image	Loads the next image of the series.

Measurement tools

	Probe Tool	Gives a pixel or a Hounsfield unit value for a given point.
	Measurement Tool - Arrow	Draws an arrow.
	Measurement Tool - Line	Measures linear distances.
	Measurement Tool - Ellipse	Measures an elliptical region of interest.
	Measurement Tool - Show Angles	Measures an angle between two intersecting lines.
	Clear Measurement Tools	Erases all measurements from all images in a selected series.
	Calibrate Measurements	Manually calibrates images.

Multiplanar tools

Show All Reference Lines	Shows the location of all the images with reference lines.
Show First and Last Reference Lines	Shows the location of the first and last images.
Show Current Reference Line	Shows the location of the currently active image.
Auto Series Synchronization	Synchronizes images that are related to each other spatially and scanned during the same exam. For example, it will not synchronize images from the same patient from different studies.
Manual Series Synchronization	Locks series belonging to the same patient together by image location.
3D Cursor	Synchronizes points between images and planes.
Measurement Tool - MPR	Creates an MPR from a 2D image.
Auto-Generate Orthogonal MPR Tools	Creates two orthogonal and one oblique MPR series from a 2D image.

Image Manipulation tools

Flip Horizontal	Flips the selected image from left to right about the vertical axis.
Flip Vertical	Flips the selected image from top to bottom about the horizontal axis.
Rotate Left 90 Degrees	Rotates the selected image 90 degrees counter clockwise.
Rotate Right 90 Degrees	Rotates the selected image 90 degrees clockwise.
Invert	Inverts the color of the images so that they are displayed either as black on white or white on black.

Volume tools

View 3D	Renders the selected series using the specified 3D mode.
Crop Volume	Crops away unwanted parts of a volume.
Rotate Volume	Rotates the volume about the screen's horizontal and vertical axes.
Toggle Stereo	Toggles the stereoscopic display mode.
Volume MPR	Generates an MPR superimposed on the face of a volume.
Opacity Settings	Allows you to assign colors to pixels in a volume.

Chapter 2: Setting User Preferences

You can customize your user, system and DICOM preferences from the *Edit Properties* dialog box. The following procedures are performed from the various tabs in the *Edit Properties* dialog box.

Note: Once you have changed your preferences, you must re-select the study in eFilm Lite for the changes to take effect to the image you are currently viewing.

Note: Your changes will be saved when you exit, and your new preferences will be the default the next time that you use eFilm Lite.

In this chapter, you will learn how to:

- change the default display settings for each modality (see "Customizing modality settings" on page 9)
- change your monitor setup(see "Customizing system preferences" on page 13)
- specify where and how to display image markers on images (see "Using image markers" on page 13)
- specify settings for images displayed as volumes (see "Customizing volume settings" on page 15)
- change your template color and display settings (see "Customizing template settings" on page 17)

Customizing modality settings

The *Modality Settings* tab allows you to change the default layout, window/level presets, and image display settings for each modality. This section shows you how to change:

- the default layout for a modality (see "Changing modality layouts" on page 9)
- advanced image display settings for a modality (see "Customizing advanced user settings for a modality" on page 10)

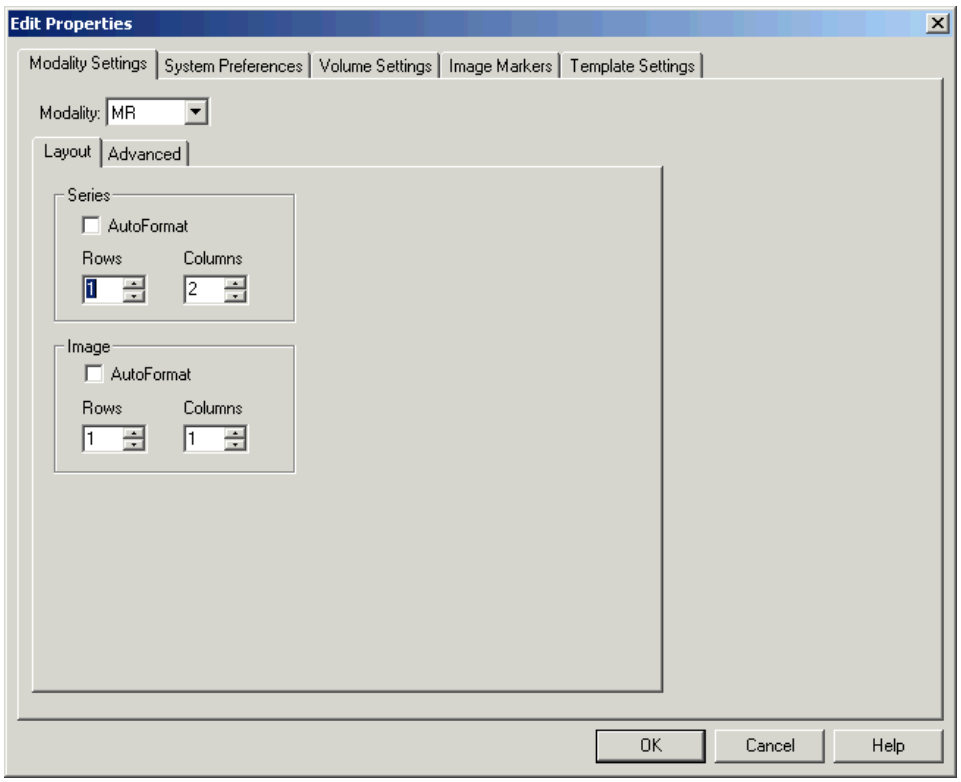
Changing modality layouts

The *Layout* tab in the *Modality Settings* tab of the *Edit Properties* dialog box allows you to customize the default image layout for each modality.

Note: This feature is useful for CR skeletal surveys where eFilm Lite loads the images in survey mode. You can then follow the procedure outlined in "Exploding series" on page 42 to move between individual images and the survey mode.

To change screen layout settings for a modality:

1. On the **Edit** menu, click **Properties**. The *Edit Properties* dialog box appears.
2. Click the **Modality Settings** tab, and then click the **Layout** tab.



3. Select the required modality from the **Modality** drop-down list.
4. Adjust the layout as required.

Note: If you want eFilm Lite to automatically create as many viewports that are necessary to display all the series in an exam, select the **AutoFormat** check boxes.

5. Click **OK** to save your changes.

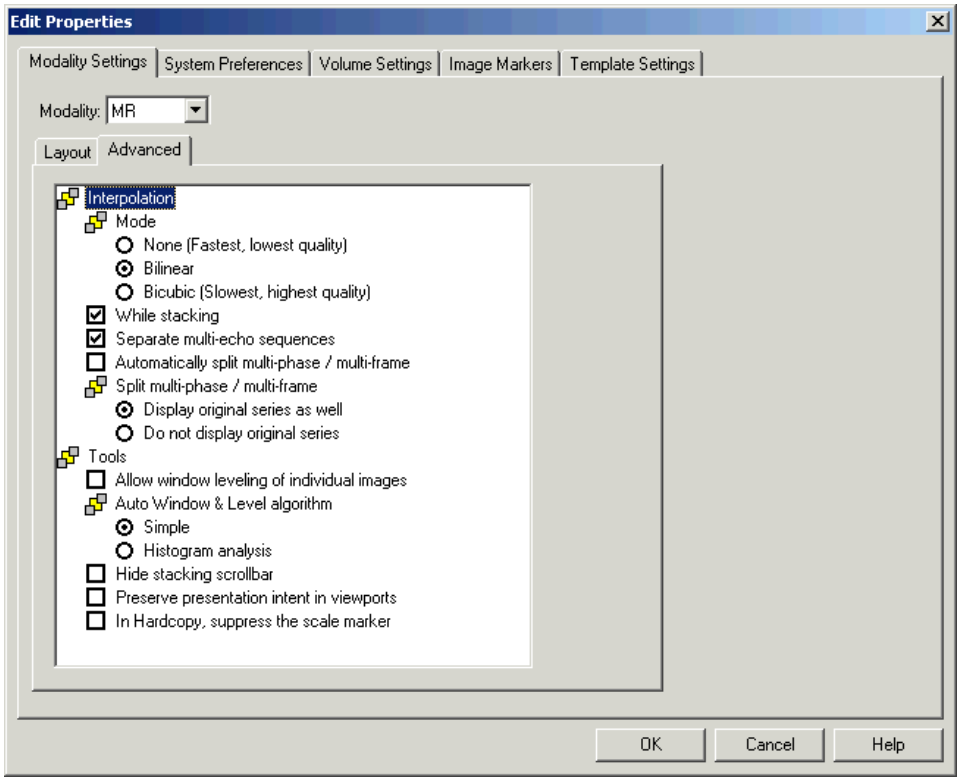
Customizing advanced user settings for a modality

The *Advanced* tab in the *Modality Settings* tab of the *Edit Properties* dialog box allows you to customize the settings for image display, interpolation, and tool behavior for each modality.

To change advanced user settings for a modality:

1. On the **Edit** menu, click **Properties**. The *Edit Properties* dialog box appears.
2. Click the **Modality Settings** tab, and then click the **Advanced** tab.
3. Select a modality from the **Modality** drop-down list.

4. Adjust the settings as required by selecting the options provided in the *Advanced User Settings* pane.



The defaults for each modality are **Bilinear Interpolation** and **Simple Window & Level algorithm**.

Note: Adjusting these defaults will affect the image processing time.

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5. The following settings are available for Interpolation:
   - Mode:
     - Select **None (Fastest, lowest quality)** to disable interpolation entirely.
     - Select **Bilinear** for a good compromise between speed and quality.
     - Select **Bicubic (Slowest, highest quality)** to minimize the effects of aliasing in your images.
   - **While Stacking**: if cleared, no interpolation will be done while stacking, which will improve performance but may result in reduced image quality. Once the stacking operation ends the current image will be re-displayed using the selected interpolation method
   - **Separate multi-echo sequences**: select to automatically split multi-echo sequences into separate series
   - **Automatically split multi-phase/multi-frame**: indicate whether to automatically split a multi-phase or multi-frame series into separate series.

Note: The **Automatically split multi-phase/multi-frame** option is selected by default for Ultrasound (US) images.

- **Split multi-phase/multi-frame**: select whether eFilm Lite will display the original series after splitting it into individual phases
  - display original series as well
  - do not display original series as well

6. The following settings are available under Tools:
   - **Allow window leveling of individual images**: select if you want to be able to alter the window/level settings independently for each image for this modality. Clear the check box to have window/level settings apply to the entire series.
   - Auto Window & Level algorithm
     - **Simple**: select to have the window and level values set to a mid-point between the minimum and maximum values in the image.
     - **Histogram Analysis**: select to have the window and level values automatically adjust based on image characteristics. This feature only works if the scanner sending the image does not define the window and level settings.
   - **Hide stacking scrollbar**: select to hide the scrollbar for multi-image series (see "Stacking images" on page 29). This is recommended for modalities such as CR, DX, and MG.
   - (for use with Hanging Protocols only) Select the **Preserve Presentation Intent in Viewports** check box if you want to preserve the presentation intent of the following image manipulation tools:
     - **Zoom** (see "Zooming" on page 41)
     - **Pan** (see "Panning" on page 40)
     - **Rotate** (see "Changing image orientation" on page 39)
     - **Flip** (see "Changing image orientation" on page 39)
     - **Toggle Overlay** (see "Overlaying text" on page 49)
     - **Annotation** (see "Annotating images" on page 50)
     - **Window/Level** (see "Adjusting window/level settings manually" on page 33)
     - **Arrow** (see "Drawing arrows" on page 53)
     - **Line** (see "Making linear measurements" on page 51)
     - **Ellipse** (see "Making elliptical measurements" on page 52)
   - **In Hardcopy, suppress the scale marker**: select to prevent the scale marker from appearing on images you print

Note: This option cannot be deactivated for the MG modality.

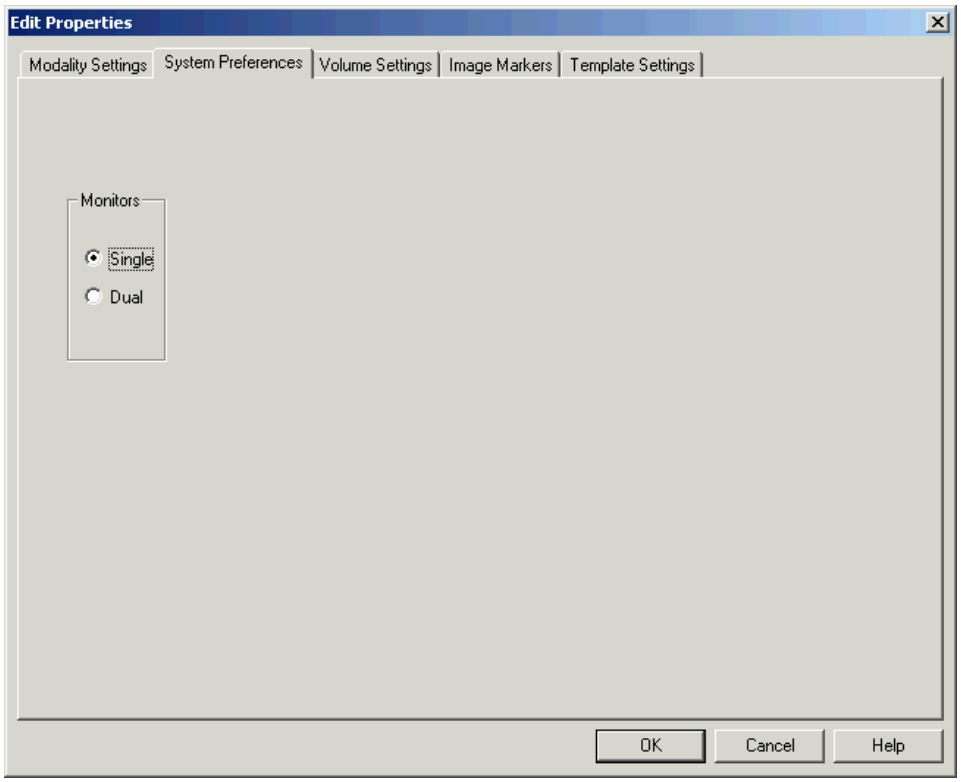
7. Click **OK** to save your changes.

Customizing system preferences

The *Preferences* tab in the *Edit Properties* dialog box allows you to customize your monitor setup.

To access the *Preferences* tab:

1. On the **Edit** menu, click **Properties**. The *Edit Properties* dialog box appears.
2. Click the **System Preferences** tab.



To configure your monitor setup:

- Select either the **Single** or **Dual** option for the setup of your monitors.

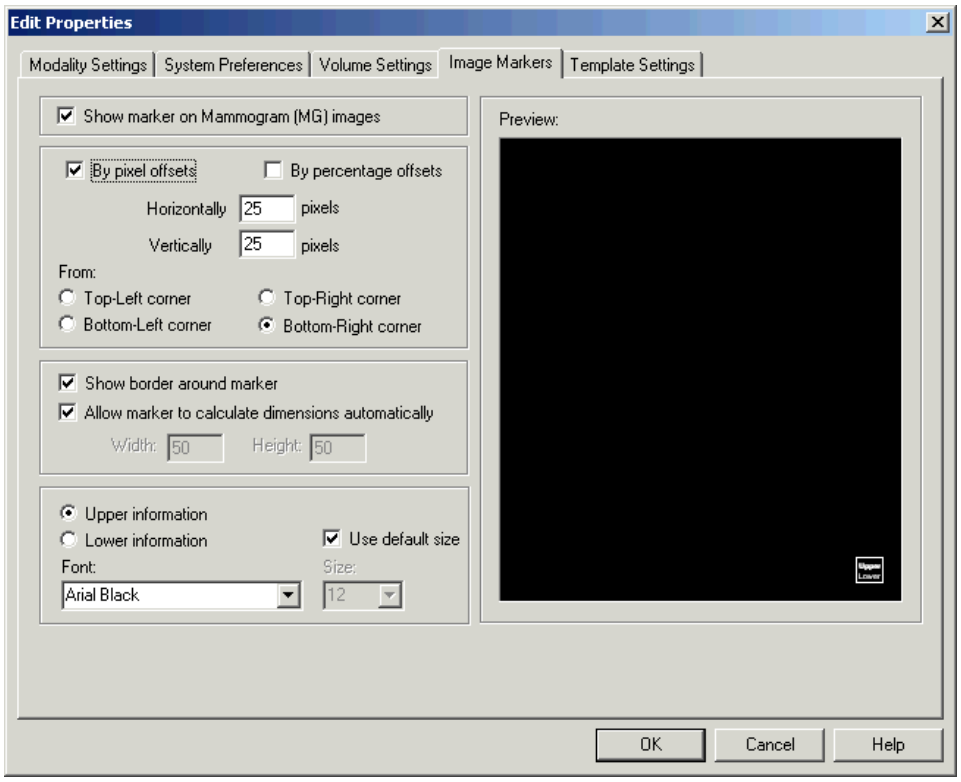
Using image markers

For mammograms, the *Image Markers* tab in the *Edit Properties* dialog box allows you to display image markers and position them as required in the image.

WARNING! eFilm is not approved for FFDM diagnostic review. All digital mammography images are for reference only.

To access the *Image Markers* tab:

1. On the **Edit** menu, click **Properties**. The *Edit Properties* dialog box appears.
2. Click the **Image Markers** tab. By default, the **Show marker on Mammogram (MG) images** check box is selected.



Note: Digital mammography scanners attach image markers to their studies so that breast images can be properly identified. The default setting for this tab is set to display image markers. If you do not want image markers, then clear the **Show marker on Mammogram (MG) images** check box.

To position image markers:

1. Select the corner on which to display the image marker (i.e., Top-Left Corner, Bottom-Left Corner, Top-Right Corner or Bottom-Right Corner).
2. Additionally, you can offset the image marker from the corner by pixels or percentage.
   - Select either the **By pixel offsets** or **By percentage offsets** radio button which will position the image marker either by pixels or by percentage respectively.
   - Move the position of the image marker by inserting values in the **Horizontally** and **Vertically** fields.

   Note: The preview screen updates according to your selection.

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3. Click **OK** to save your changes.

To format image markers:

1. Choose one of the following options:
   - If you want to remove the border, clear the **Show border around marker** check box.
   - If you want to keep the border, but change its size, select the **Show border around marker** check box, and clear the **Allow marker to calculate dimensions automatically** check box.

   The **Width** and **Height** fields are activated, so that you can enter your custom border dimensions.

   Note: You can change the upper information font, select the **Upper information** option, and select a font from the drop-down list. To change the lower information font, repeat this step with the **Lower information** option.

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2. To change the font size, clear the **Use default size** check box. This activates the **Size** drop-down list, so that you can select a different font size.
3. Click **OK** to save your changes.

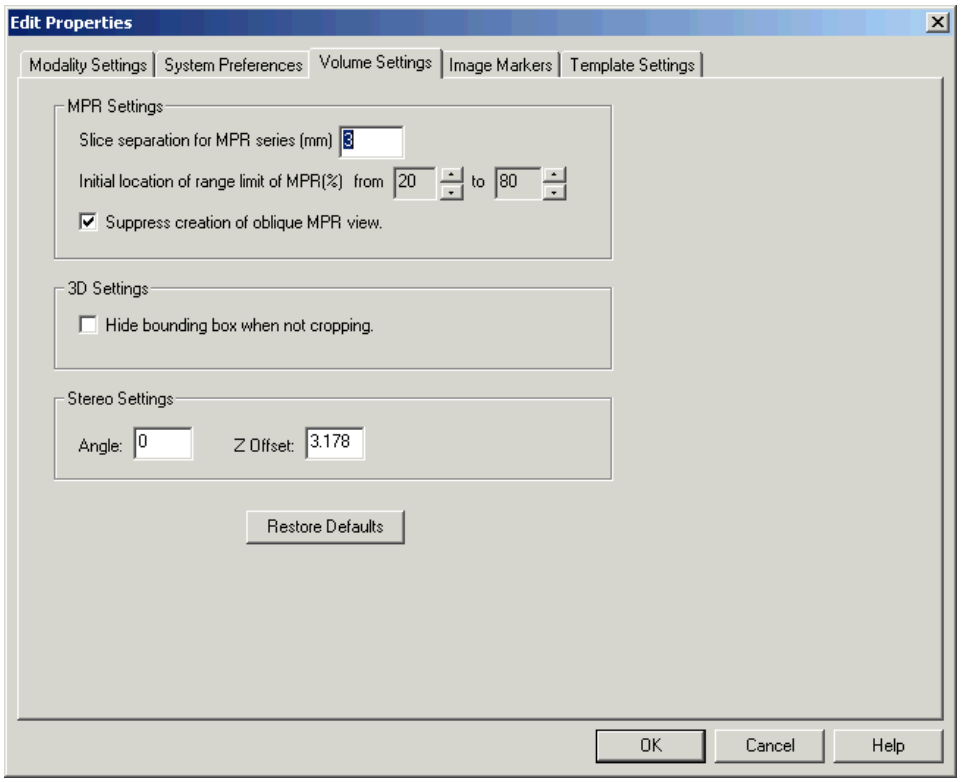
Customizing volume settings

The *Volume Settings* tab in the *Edit Properties* dialog box allows you to customize your volume and stereo display settings (see "Viewing 3D images in stereo display mode" on page 67).

To access the *Volume Settings* tab:

1. On the **Edit** menu, click **Properties**. The *Edit Properties* dialog box appears.

2. Click the **Volume Settings** tab.



To customize your stereoscopic display settings:

1. Change the **Angle** value to increase or decrease the strength of the stereo effect.

   Note: Increasing the angle increases the shift between the red and blue images.

2. Change the **Z Offset** value to make the stereo volume appear to float in front of or behind the display surface. The default value places the stereo volume at the center of the screen's surface.

   Note: To return the stereo settings to their default values, click **Restore Defaults**.

3. Click **OK** to save your changes.

To customize your volume display properties:

1. Select the **Hide bounding box when not cropping.** check box to hide the wire frame surrounding the volume when it is not in crop mode.
2. Select the **Suppress creation of oblique MPR view** to keep eFilm Lite from generating this view when **Auto-Generate MPR** is selected.
3. Change the **Slice Separation for MPR Series (mm)** value to adjust the slice spacing used to create your MPR views.
4. Change the **Initial location of range limit** settings to adjust the default MPR range limits.
5. Click **OK** to save your changes.

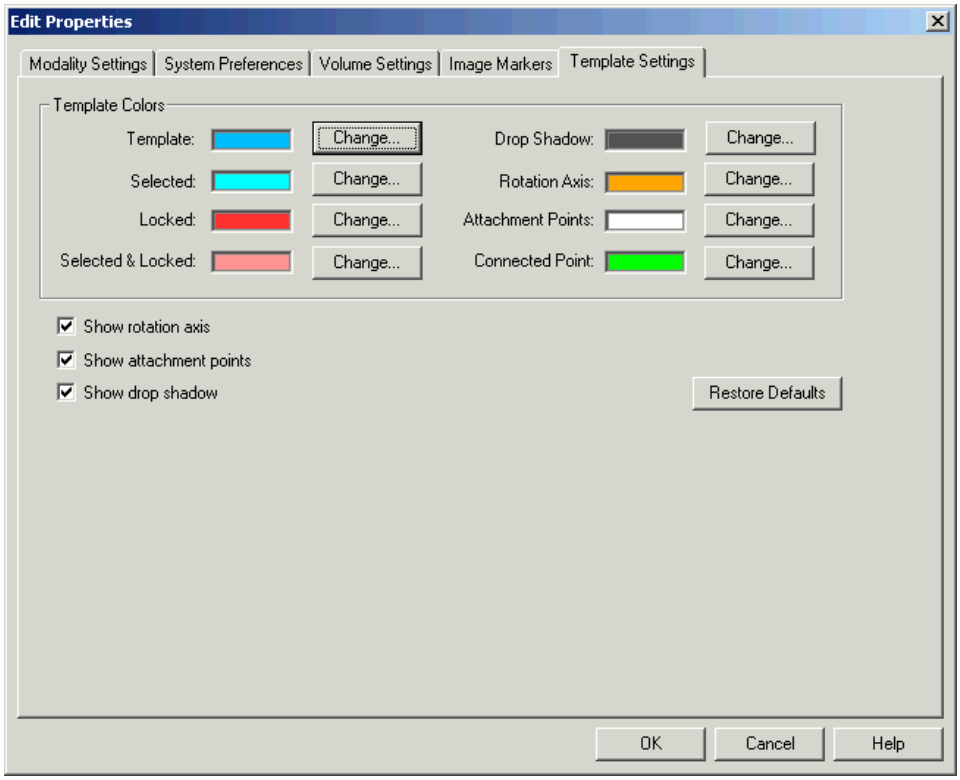
Customizing template settings

The *Template Settings* tab in the *Edit Properties* dialog box allows you to customize your orthopaedic template display colors.

Note: These settings are not applicable to eFilm Lite as the Templates feature is not available.

To access the *Template Settings* tab:

1. On the **Edit** menu, click **Properties**. The *Edit Properties* dialog box appears.
2. Click the **Template Settings** tab.



To customize the template display colors:

1. Click **Change** beside the template color you want to customize. The *Color* dialog box appears.
2. Select a basic color or create your own custom color to use as the new template color.

   Note: You can create custom colors either by using the color selector on the right, or by adjusting the RGB values directly. Once you have created a new color, add it to the *Custom colors* list by clicking **Add to Custom Colors**.

3. Click **OK** to save your changes.

To customize the template display properties:

1. Select the **Show Rotation Axis** check box to display the rotation axis of the template.
2. Select the **Show Attachment Points** check box to display the attachment points of the template.
3. Select the **Show Drop Shadow** check box to display a drop shadow in the template.

   Note: To return the template settings to their default values, click **Restore Defaults**.

4. Click **OK** to save your changes.

Chapter 3: Viewing Images

A study is a set of related images which can be displayed and manipulated in eFilm Lite. You retrieve images stored on CDs and DVDs. In this chapter, you will learn how to:

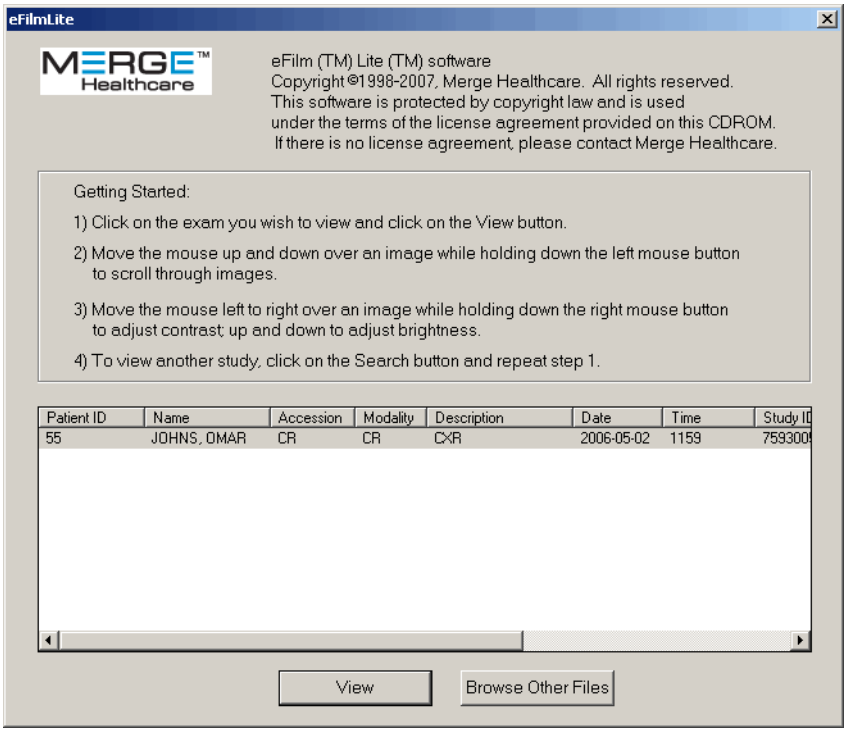
- use the eFilm Lite viewer (see "Using the eFilm Lite viewer" on page 19)
- view and arrange a study (see "Viewing studies" on page 20)
- select individual or multiple images and series (see "Selecting images and series" on page 25)

Using the eFilm Lite viewer

The eFilm Lite viewer allows you to select a study to view in the *eFilm Lite* window.

To access the eFilm Lite viewer:

- On the **File** menu, click **Search**, or click .


eFilmLite
MERGE Healthcare
eFilm (TM) Lite (TM) software
Copyright ©1998-2007, Merge Healthcare. All rights reserved.
This software is protected by copyright law and is used
under the terms of the license agreement provided on this CDROM.
If there is no license agreement, please contact Merge Healthcare.
Getting Started:
1) Click on the exam you wish to view and click on the View button.
2) Move the mouse up and down over an image while holding down the left mouse button to scroll through images.
3) Move the mouse left to right over an image while holding down the right mouse button to adjust contrast; up and down to adjust brightness.
4) To view another study, click on the Search button and repeat step 1.
Patient ID
Name
Accession
Modality
Description
Date
Time
Study ID
55
JOHNS, OMAR
CR
CR
CXR
2006-05-02
1159
View
Browse Other Files

The pane lists the studies that are stored in DICOMDIR format on your CD.

Customizing the eFilm Lite viewer

You can customize the eFilm Lite viewer to suit your preferences by re-sorting the columns and repositioning the fields in the CD exam list.

To customize the eFilm Lite viewer:

1. Click a header to sort the list according to that heading. For example, click **Name** to sort the list alphabetically, or click **Patient ID** to sort the list numerically.

   Tip: Clicking the header field again will sort the list in the reverse order.

2. Click and hold the header you want to move, and drag-and-drop it to a new location.

   Note: These changes cannot be preserved.

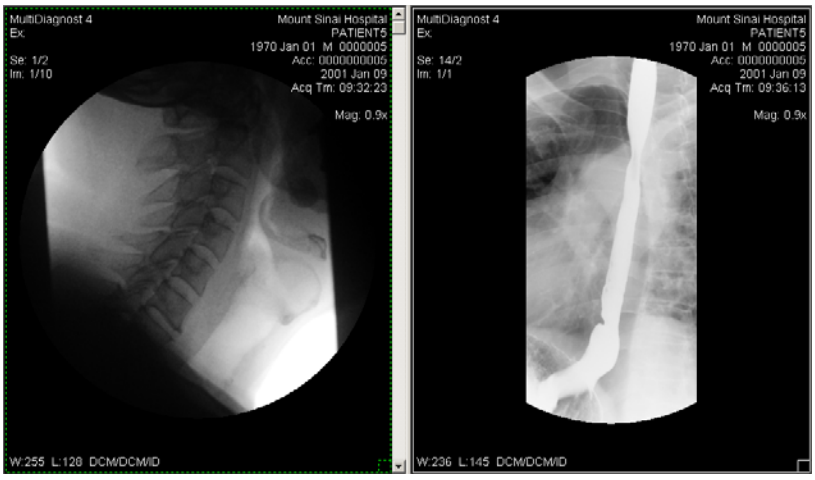
Viewing studies

This section provide a general reiteration of those procedures. In addition to learning how to view a study, this section will also show you how to:

- arrange study/series in the main window (see "Arranging study series in panes" on page 21)
- view information for a study (see "Viewing study information" on page 22)
- set an encryption password (see "Setting the encryption password" on page 23)
- change the layout of the screen (see "Adjusting the screen layout" on page 23)
- compare and contrast multiple studies (see "Comparing multiple studies" on page 24)

To view a study:

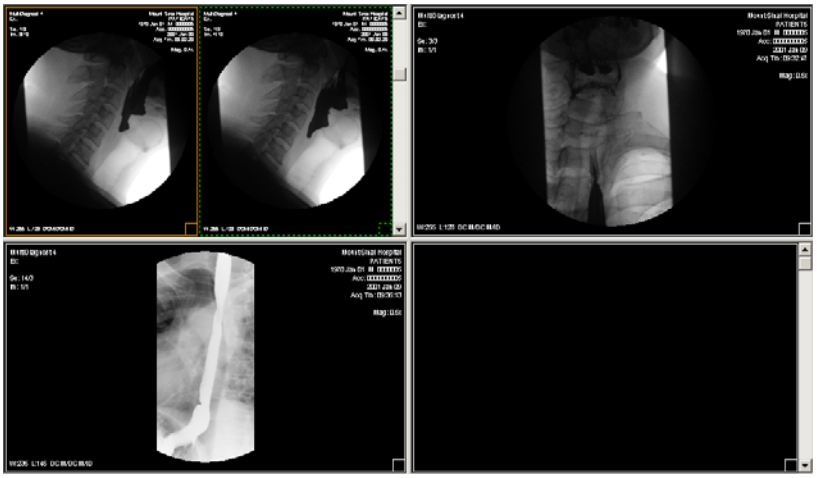
- Select a study from the list and double-click it to view it automatically, or select a study from the list and click **View**. The study appears in the main window, and the toolbar is activated.



Note: Images appear side-by-side in a grid (default setting = 1x2), like the films mounted beside each other on a light box. This grid configuration can be adjusted by following the procedure outlined in "Adjusting the screen layout" on page 23.

Arranging study series in panes

When viewing a study, each series within the study is loaded into a separate pane. The active series is outlined in orange and the active image in a series is outlined with a green line.



To place a series in a particular pane:

1. Right-click the pane where you wish to place the series. A pop-up menu appears. The series that is currently occupying the pane is checked in this menu.

   Note: In the interests of speed, when you load a study the right-click context menu is first populated with a list of related studies. The studies themselves are then loaded, starting with the most recent studies and working backward to the oldest studies.

2. Select a series from the menu using the left mouse button.

   Note: The pop-up menu displays all the studies belonging to a patient, as long as they are available as local or Image Channel exams that correspond with the Patient ID.

3. If the series is currently displayed and you want to move it to another pane, hold **Shift**, select the series you wish to move, and drag-and-drop it in a different pane.

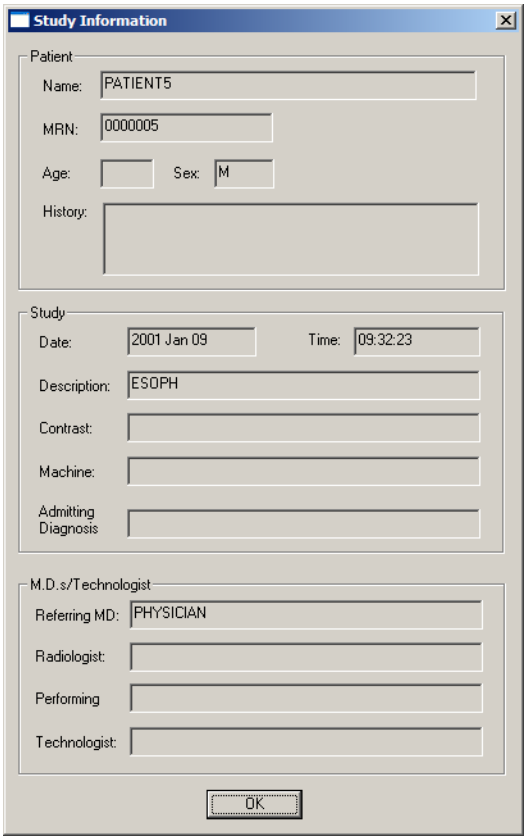
Viewing study information

Study information can be requested while viewing the study.

Note: If confidential patient data is encrypted, you can decrypt it by entering the encryption password (see "Setting the encryption password" on page 23).

To view study information:

1. Open and view a study.
2. Click . The *Study Information* dialog box appears.



3. Click **OK** to close the *Study Information* dialog box.

Setting the encryption password

You can enter an encryption password that will be required to decrypt confidential patient information. Using an encryption password prevents unauthorized users from viewing sensitive patient data on your computer.

Note: Currently, only the patient name is encrypted.

To set an encryption password:

1. On the **Utility** menu, click **Set Password...** The *Encryption Password* dialog box appears.

Encryption Password
The password you enter acts as the "key" to encrypting and decrypting confidential patient information. Please remember it!
Password:
Confirm Password:
OK
Cancel

2. Enter a password, and then confirm the password by entering it again.

Note: The length of this password must be at least five characters.

Note: Do not forget your password. eFilm customer support cannot retrieve your password.

3. Click **OK** to set the encryption password, or click **Cancel** to exit without setting it.

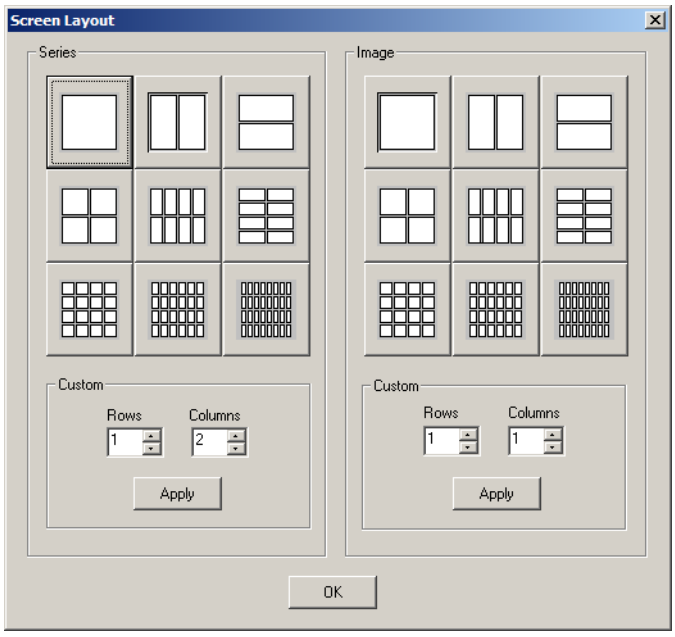
Adjusting the screen layout

Images that appear on the screen are laid out in a side-by-side (1x2) grid configuration by default. This configuration can be adjusted to suit your preferences.

To adjust the screen layout:

1. Choose one of the following options to access the *Screen Layout* dialog box:
   - On the **Tools** menu, click **Screen Layout**
   - Click

2. The *Screen Layout* dialog box appears. The *Series* layout determines the format of the panes in the window. Each pane can contain one series. The *Image* layout determines the format of the images within the active series.



3. Select a layout for the series/image, or define the values for rows and columns, and click **Apply**.
4. Click **OK** to close the *Screen Layout* dialog box.

Note: Different series may have different image formats. For example, a CT exam with two series (one scout, one axial) may be displayed using a 1x2 series layout. Furthermore, the images in the scout series may be displayed in a 1x1 format, and the axials in a 2x2 format.

Comparing multiple studies

Multiple studies can be compared either by preselecting all studies or by selecting additional studies while viewing a study.

Note: The *Study Manager* window will flag the first selected study with an asterisk.

To pre-select studies for comparison:

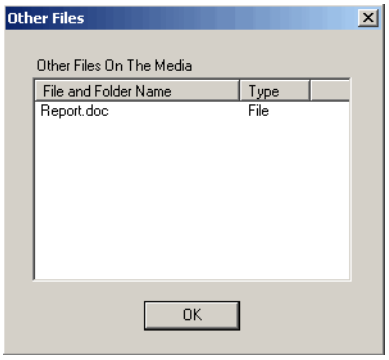
1. Select the first study from the *Local Exams* list.
2. Press **Ctrl** and select each additional study. When finished selecting, release **Ctrl**.
3. Click **View** to load the selected studies.
4. Change the screen layout as required (see "Adjusting the screen layout" on page 23).

Viewing non-DICOM objects

If the CD or DVD includes non-DICOM objects (e.g., Microsoft Word documents), you can view a list of these objects from the eFilm Lite viewer. To access these non-DICOM objects on the media, you must use Windows Explorer and browse to the location of these objects on the CD or DVD.

To view a list of non-DICOM objects on the media

1. From the eFilm Lite viewer (see "To access the eFilm Lite viewer:" on page 19), click **Browse Other Files**.
2. In the Other Files dialog box, select the file you want to open and click **OK**.



Tip: You can also drag a DICOM file from Windows Explorer into the main eFilm window.

Selecting images and series

This section shows you how to select:

- a single image, or multiple images (see "Selecting images" on page 25)
- a single series, or multiple series (see "Selecting series" on page 26)

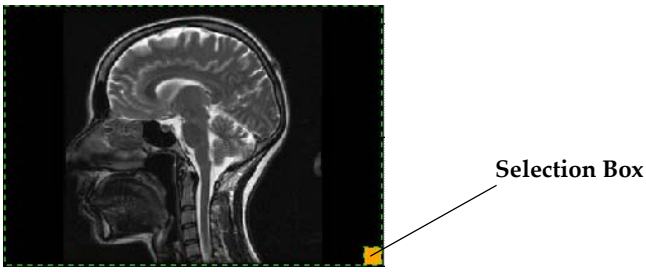
Selecting images

These procedures allow you to select a single image, multiple images, or all images in a series.

To select a single image:

1. View the image that you want to select in any pane.

2. Select the selection box in the lower right corner of the image. The selection box fills in orange to indicate that it is selected.



To select multiple images:

1. View the first image that you want to select in any pane.
2. Select the selection box in the lower right corner of the image. The selection box fills in orange to indicate that it is selected.
3. Continue this procedure to select additional images.

Note: Selected images remain selected as you scroll through the series. You can select every other image in the series by clicking **Select Every 2nd Image In Series** on the **Edit** menu.

Selecting series

These procedures allow you to select a single series, multiple series, or all series in a study.

To select a single series:

- Click a series in any pane in the window.

  The border around the selected series turns green.

To select multiple series:

- Hold **Ctrl** and click a number of series in any pane in the window.

  The borders around all of the selected series turn green.

or in conjunction with a visualization services server. Lite

Chapter 4: Navigating Images

This section covers selecting and moving through images and series.

In this chapter, you will learn how to:

- navigate through images in a series (see "Moving through images" on page 27)
- navigate through series in a study (see "Moving through series" on page 30)
- navigate between studies (see "Moving through studies" on page 30)
- synchronize series (see "Synchronizing series" on page 30)
- locate points on an image in 3D space (see "Locating points in 3D space" on page 31)

Moving through images

There are four different ways in which you can navigate through the images in a series:

- **Next/Previous Image:** allow you to move through the images of a series one at a time (see "Using the toolbar to move through images" on page 27)
- **Scrollbar:** allows you to either move through images one at a time or easily scroll though the images of a series (see "Using the scrollbar to move through images" on page 28).
- **Stacking:** allows you to quickly and easily move through the images of a series (see "Stacking images" on page 29).
- **Cine:** dynamically displays the stacked images for a video display viewing (see "Using the Cine tool" on page 29).

Using the toolbar to move through images

The Next/Previous Image buttons move through the images in a series one at a time.

To go to the next image in a series:

1. Select the required series.
2. Choose one of the following options:
   - Click
   - Press **PgDn**

To go back to the previous image in a series:

1. Select the required series.
2. Choose one of the following options:
   - Click
   - Press **PgUp**

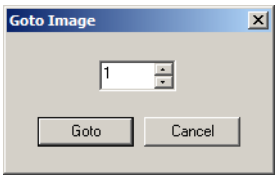
To go to the beginning or end of a series:

1. Select the required series.
2. Choose one of the following options:
   - Press **Home** to go to the beginning of the series
   - Press **End** to go to the end of the series

To go to a specific image in a series:

1. Select the required series.
2. Choose one of the following options:
   - On the **Tools** menu, click **Stack Options**
   - Click the arrow to the immediate right of

   The *Stack* pop-up menu appears.
3. Select **Goto Image**. The *Goto Image* dialog box appears.



4. Enter the image order number and click **Goto** to display the required image.

Using the scrollbar to move through images

The scrollbar allows you to both move through images one at a time, and scroll easily though the images of a stacked series.

To scroll through images one at a time:

- Click the Up or Down scrollbar arrow once to move to the next or previous image in the series.

To scroll through images of a stacked series:

- Click and hold the Up or Down scrollbar arrow to scroll forward or backward through the stack, or click and drag the scrollbar bubble up or down.

Stacking images

Stacking allows you to move quickly and easily through the images of a stacked series.

To stack images in a series:

1. Select the required series.
2. Optionally, choose one of the following options to define how you want the images to be sorted:
   - On the **Tools** menu, click **Stack Options**
   - Click the arrow to the immediate right of

   The *Stack* pop-up menu appears.
3. Optionally, select how you want to sort the images in the stack. You can sort by **Image Number**, **Slice Location**, **Reverse Slice Location**, **Acquisition Time**, or **Image Time**.

   Position the mouse pointer over the series, and click and drag it up or down within the pane.

Note: Stacking becomes faster once you have loaded all images in a series into memory by viewing them. To automate this, you might consider using the Cine tool (see "Using the Cine tool" on page 29).

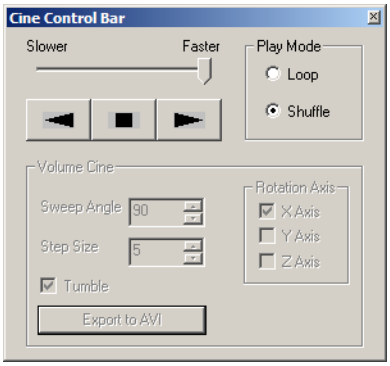
Using the Cine tool

The Cine tool allows you to view stacked images dynamically in a movie-like display format.

To use the Cine tool:

1. Select the series you want to view.
2. Choose one of the following options:
   - On the **Tools** menu, click **Cine**
   - Click

   The *Cine Control Bar* dialog box appears.



3. Adjust the speed of the cine using the slider.
4. Select the play mode. **Loop** repeatedly displays the sequence from the first to the last image in a series. **Shuffle** moves back and forth through the images between the first and last one in a series.

5. Click ► to move forward, ◄ to move backward, or ■ to stop the cine.

Moving through series

You can move through different series of images using the Next and Previous Series tools.

Note: You can also right-click on any image to open a pop-up menu, from which you can select the required series.

To go to the next series in an open study:

- Choose one of the following options:
  - On the **Tools** menu, click **Next Series**
  - Click

To go to the previous series in an open study:

- Choose one of the following options:
  - On the **Tools** menu, click **Previous Series**
  - Click

Moving through studies

After viewing a study, you can go to the next or previous study in your *Local Exams* list.

To go to the next study:

- Choose one of the following options:
  - On the **Tools** menu, click **Next Study**
  - Click

To go to the previous study:

- Choose one of the following options:
  - On the **Tools** menu, click **Previous Study**
  - Click

Synchronizing series

The Synchronizing tool allows you to bring all series in the same plane into alignment. This tool uses the series slice location to line up image navigation for these series in panes. With synchronization, you can navigate through the images of one series (i.e., scroll, cine), and all other series with images in the same plane will navigate accordingly.

This section shows you how to synchronize series:

- automatically (see "Synchronizing series automatically" on page 31)
- manually (see "Synchronizing series manually" on page 31)

Synchronizing series automatically

This method of synchronization is performed automatically; it synchronizes images that are related to each other spatially and scanned during the same exam, but it will not synchronize images from the same patient from different studies. The series must be from the same patient or study; otherwise, you must perform synchronization of these series manually.

To synchronize series of the same plane automatically:

1. Select the image/plane with which you want all others to synchronize.
2. Choose one of the following options:
   - On the **Tools** menu, click **Auto Series Synchronization**
   - Click

If you detect an offset in the images, you can manually synchronize the images (see "Synchronizing series manually" on page 31).

Synchronizing series manually

This method allows you to perform synchronization manually. If the new series is from a different patient or study than the original, you can still perform manual synchronization if the series are related.

To manually synchronize series of the same plane:

1. Scroll through each series and display the images you want to synchronize.
2. Choose one of the following options:
   - On the **Tools** menu, click **Manual Series Synchronization**
   - Click

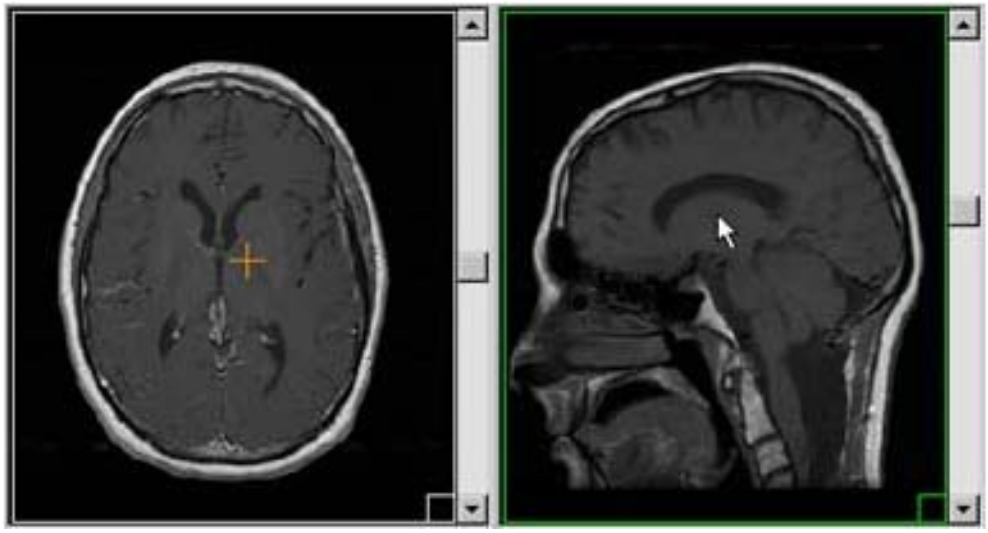
Locating points in 3D space

The 3D Cursor tool allows you to locate a point in space in all planes.

To locate a point in space in all planes:

1. Choose one of the following options:
   - On the **Tools** menu, click **3D Cursor**
   - Click
2. Right-click on any displayed 2D image. This same point will be indicated on all other 2D images, regardless of the plane, by a **+**. In order to find the point in another series, eFilm Lite may need to display different slices in those series. Not all points in the

current images necessarily exist on other series. In this case, the **+** sign will not be displayed.



You can drag the point around the image and the corresponding points in the other images will move accordingly. You can navigate through the images (i.e., stack, cine) and you will still see the point in 3D space.

Chapter 5: Manipulating Images

This section covers manipulating image display functionality, such as orientation, magnification, field of view, and colorization.

In this chapter, you will learn how to:

- adjust window/level settings for images (see "Setting window/level values" on page 33)
- invert image color (see "Inverting images" on page 36)
- overlay reference lines on an image (see "Overlaying reference lines" on page 37)
- change image orientation (see "Changing image orientation" on page 39)
- adjust your view of an image (see "Adjusting image viewing options" on page 39)
- reset image settings (see "Resetting the original image settings" on page 42)
- adjust your view of a series (see "Adjusting series viewing options" on page 42)
- fuse multi-modality images (see "Using image fusion" on page 44)
- split multi-phase series into separate series (see "Splitting a series" on page 47)

Setting window/level values

Window leveling allows you to adjust the brightness and contrast of images. This section shows you how to:

- adjust window/level settings manually (see "Adjusting window/level settings manually" on page 33)
- adjust window/level settings using window/level presets (see "Using window/level presets" on page 35)
- use non-linear window leveling (see "Using non-linear (sigmoidal) window leveling" on page 36)

Adjusting window/level settings manually

This method allows you to perform manual adjustments to window/level settings quickly and easily.

Adjusting brightness

The level setting controls the brightness of an image.

To adjust the brightness of an image:

1. Choose one of the following options:
   - On the **Tools** menu, click **Window/Level**

- Click

From here, you can adjust the brightness of the selected image.

2. Position the cursor over the image to be adjusted, and right-click and drag the cursor up or down over the image.
3. Release the mouse button to apply the new values to all images within the series. These values are displayed on the lower left corner of each image (e.g., W:33/L:777).

Adjusting contrast

The window setting controls the contrast of an image.

To adjust the contrast of an image:

1. Choose one of the following options:
   - On the **Tools** menu, click **Window/Level**
   - Click

   From here, you can adjust the contrast of the selected image.
2. Position the cursor over the image to be adjusted, and right-click and drag the cursor left or right over the image.
3. Release the mouse button to apply the new values to all images within the series. These values are displayed on the lower left corner of each image (e.g., W:33/L:777).

Note: To achieve a finer resolution with window leveling, use the arrow cursor keys (up and down to adjust brightness, and right and left to adjust contrast). To compensate for any inherent non-linearities in an image, use non-linear window leveling (see "Using non-linear (sigmoidal) window leveling" on page 36).

Adjusting manual window/level control sensitivity

The sensitivity of the manual adjustment is set by a relative number. If the change between window levels is too sensitive and changes too much while you are moving the cursor over the image, then lower the sensitivity value. If the change between window levels is not sensitive enough, then increase the sensitivity value.

To adjust the sensitivity:

1. Choose one of the following options:
   - On the **Tools** menu, click **Window/Level Options**
   - Click the arrow to the immediate right of

   The *Window/Level* pop-up menu appears.
2. Select **Sensitivity** from the *Window/Level* pop-up menu. The *Window/Level Sensitivity* control bar appears.
3. Adjust the sensitivity value either by using the up or down arrows, or by entering the specification manually. The specification is a relative number that you define.
4. Click **OK**.

Note: When you change the sensitivity, the new value becomes the default and is applied to all images and studies until it is changed again.

Using window/level presets

This method allows you to perform adjustments to window/level settings using the presets.

Note: Avoid pressing the window/level key presets repeatedly while viewing 3D images, unless you are viewing these images using DirectX 8.1.

To apply window/level presets:

1. Select the required series.
2. Click the arrow to the immediate right of . The *Window/Level* pop-up menu appears.

   Note: The *Window/Level* pop-up menu differs per modality.

3. Select a preset from the menu. Alternatively, you can use the Function keys (as specified in the menu) at the top of the keyboard, or press **F2** to scroll through all the window/level presets.

   Available presets

CT	Chest, Abdomen/Pelvis, Lung, Brain, Bone, Head Neck
US	Low Contrast, Medium Contrast, and High Contrast
MR	Abdomen/Pelvis T2, Brain, Head/Neck, Spine, Abdomen/Pelvis T1

Specifying custom window/level values

You can specify custom window level values using the following procedure.

To specify custom window/level values for a series:

1. Select a series.
2. Choose one of the following options:
   - On the **Tools** menu, click **Window/Level Options**
   - Click the arrow to the immediate right of

   The *Window/Level* pop-up menu appears.
3. Select **Custom** from the *Window/Level* pop-up menu. The *Custom Window/Level* control bar appears.
4. Adjust the Window and Level values by using the spin arrows, or by entering the values manually. These specifications will appear in the lower left hand corner of each pane (e.g., W:50/L:100).
5. Click **Apply** to save the changes, or click **Cancel** to exit without saving any changes.

Note: Custom specifications only apply to the selected series.

Using non-linear (sigmoidal) window leveling

You can use non-linear window leveling to compensate for any inherent non-linearities in an image. Sigmoidal window levelling applies a wider range to the ends of your windowing range, thus giving the image values in the middle range greater contrast and resolution.

To select non-linear window leveling:

1. Select a series.
2. Choose one of the following options:
   - On the **Tools** menu, click **Window/Level Options**
   - Click the arrow to the immediate right of

   The *Window/Level* pop-up menu appears.
3. Select **Sigmoidal** from the *Window/Level* pop-up menu. The non-linear window leveling function is applied to the image and is automatically activated.

Setting alpha and beta values

The alpha/beta tool allows you to adjust the coherence and/or black/white bias settings of the images in a series.

To adjust the coherence and black/white bias settings of an image:

1. Click or select **Tools > Alpha (Coherence)/Beta (Black/White Bias)**.
2. Position the cursor over the image to be adjusted, and click and drag the cursor left or right over the image to adjust its coherence (Alpha).
3. Position the cursor over the image to be adjusted, and click and drag the cursor left or right over the image to adjust its black/white bias (Beta).
4. Release the mouse button to apply the new value to all images within the series. This value is displayed on the lower left corner of each image (e.g., A:4.00 B:5.00).

Inverting images

Inverting allows you to invert the sense in which the brightness of displayed pixels is calculated. By default, low intensity pixels are dark on the screen, and high intensity pixels are bright. Using the Invert tool will change this so that low intensity pixels are bright and high intensity pixels are dark. Applying this tool again restores the previous pixel intensity setting.

To invert the color of images in selected series:

1. Select the image to invert.
2. Choose one of the following options:
   - On the **Tools** menu, click **Invert**
   - Click

Overlaying reference lines

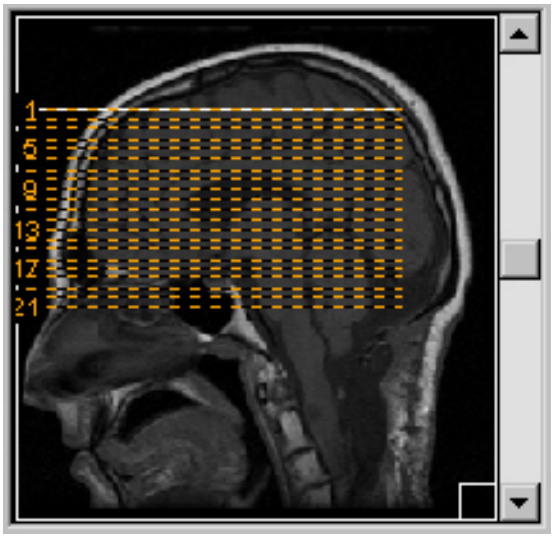
Overlaid reference lines allow you to indicate the location of an image slice on another image of an intersecting plane. Reference lines are only available for CT and MR studies.

You can show any or all of the following with this function:

- Location of all image slices of the selected series on all intersecting planes, or
- Location of the first and last image slices, or
- Only the current image slice.

To display the location of all image slices:

1. Select an image.
2. Choose one of the following options:
   - On the **Tools** menu, click **Show All Reference Lines**
   - Click

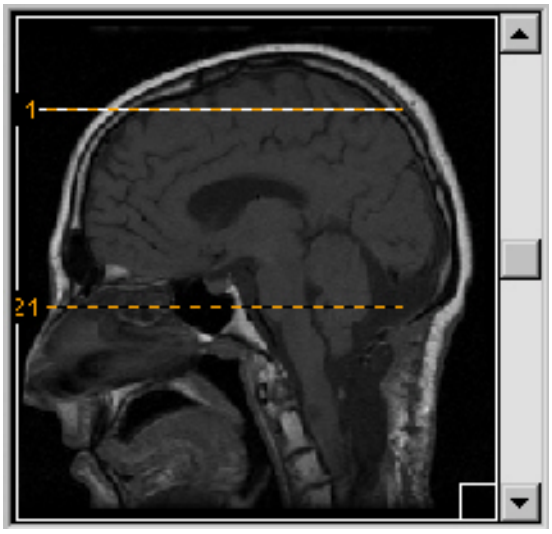


Note: The number at the end of each line is the image number.

To display the location of the first and last image slices:

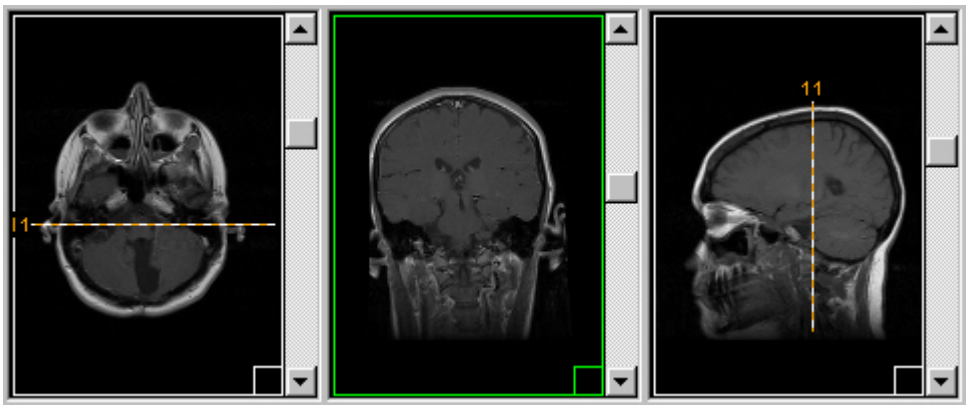
1. Select an image.
2. Choose one of the following options:
   - On the **Tools** menu, click **Show First and Last Reference Lines**

- Click



To display the location of the currently active image:

1. Select an image.
2. Choose one of the following options:
   - On the **Tools** menu, click **Show Current Reference Line**
   - Click



Note: As you scroll through the images of a series, the current reference line on other images changes accordingly. You can view the first and last reference lines and current reference line at the same time.

Changing image orientation

For both 2D and 3D images, the following four procedures can be used to change image orientation.

Note: For additional 3D specific rotation procedures, refer to "Creating 3D Images" on page 61.

To flip an image 180° about the horizontal axis:

1. Select the image to flip.
2. Choose one of the following options:
   - On the **Tools** menu, click **Flip Horizontal**
   - Click

To flip an image 180° about the vertical axis:

1. Select the image to flip.
2. Choose one of the following options:
   - On the **Tools** menu, click **Flip Vertical**
   - Click

To rotate an image 90° counterclockwise:

1. Select the image to rotate.
2. Choose one of the following options:
   - On the **Tools** menu, click **Rotate 90 Degrees Counter Clockwise**
   - Click

To rotate an image 90° clockwise:

1. Select the image to rotate.
2. Choose one of the following options:
   - On the **Tools** menu, click **Rotate 90 Degrees Clockwise**
   - Click

Note: These functions are applied to all selected series and images in the selected series.

To restore the original image orientations, click .

Adjusting image viewing options

eFilm Lite includes tools for adjusting the active image view. This section shows you how to:

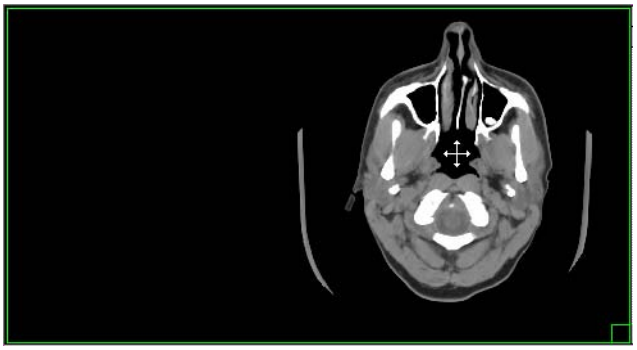
- pan around an image (see "Panning" on page 40)
- magnify an image (see "Magnifying" on page 40)
- zoom in and out on an image (see "Zooming" on page 41)

Panning

Panning allows you to position images within the pane. This feature is especially useful when the image is larger than the pane, as it usually is after zooming.

To move an image within the pane:

1. Choose one of the following options:
   - On the **Tools** menu, click **Pan**
   - Click
2. Position the cursor over the image you want to move, and click and drag the cursor around the pane to move the image.



3. Release the mouse button to drop the image in its new position.

Note: To restore the original image display value (except window/level), click .

Magnifying

Magnifying allows you to magnify an area of interest within a small, separate magnification window that moves in conjunction with the cursor.

To magnify an area of interest:

1. Choose one of the following options:
   - On the **Tools** menu, click **Magnification Options**
   - Click the arrow to the immediate right of

   The *Magnification* pop-up menu appears.
2. Select one of the following percent magnification values: **200%**, **400%**, **600%**, or **800%**.

Note: This value becomes the default until it is changed again.

3. Click and drag the mouse over the area of the image you want to magnify. The magnifying window appears and follows the cursor as it magnifies the selected area.

4. Release the mouse button to close the magnifying window.

Zooming

There are three methods of performing zooming: manual, preset, and custom zooming. Pixel-for-pixel mode, which treats each pixel in the DICOM image as one pixel on your monitor, is also available in this section.

Important: Images with a 1:1 pixel aspect ratio look normal when pixel-for-pixel mode is applied; however, for images with a different pixel aspect ratio will look compressed in one direction, as this feature represents actual pixels, but not presentation intent. In these cases, you must exit pixel-for-pixel mode by selecting another zoom value.

To zoom in and out of an image manually:

1. Choose one of the following options:
   - On the **Tools** menu, click **Zoom**
   - Click
2. Position the cursor over the image, and right-click and drag. Dragging up increases the image zoom and dragging down decreases it.
3. Release the mouse button to keep the image at the new zoom setting.

To set zooming specifications:

1. Select the required series.
2. Choose one of the following options:
   - On the **Tools** menu, click **Zoom Options**
   - Click the arrow to the immediate right of

   The *Zoom* pop-up menu appears.

   Note: You can select one of the preset zoom values or create a custom value.

3. Select **Custom** from the *Zoom* pop-up menu. The *Custom Zoom* control bar appears.

4. Adjust the zoom value either by using the spin arrows, or by entering the value manually.
5. Click **Apply** to save your changes.

Note: To restore the original image display value (except window/level), click .

To set pixel-for-pixel spacing:

1. Select the required series.
2. Choose one of the following options:
   - On the **Tools** menu, click **Zoom Options**
   - Click the arrow to the immediate right of

   The *Zoom* pop-up menu appears.
3. Select **Pixel-for-Pixel** from the *Zoom* pop-up menu.

   The image is adjusted to its true pixel-for-pixel setting.

Resetting the original image settings

The Reset Image Settings tool restores the original values of an image. You can reset the image settings after measuring, zooming, panning, changing orientation, annotating, or matching field of view. However, the reset will not affect changes due to filters or window/level settings.

To reapply original image settings:

- Choose one of the following options:
  - On the **Tools** menu, click **Reset Image Settings**
  - Click

Adjusting series viewing options

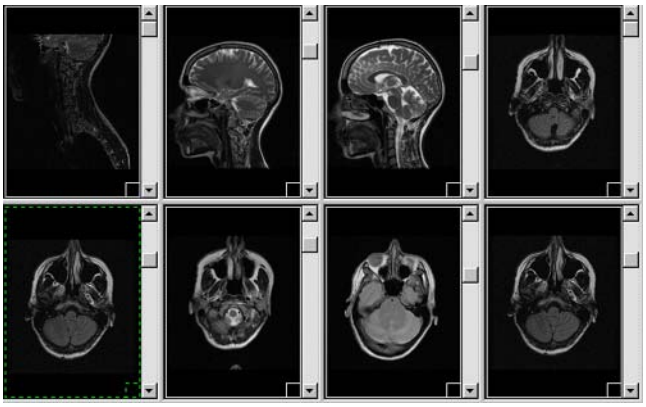
eFilm Lite includes tools for adjusting the selected series view. This section shows you how to increase or decrease the size of the image panes used to display a series (see "Exploding series" on page 42).

Exploding series

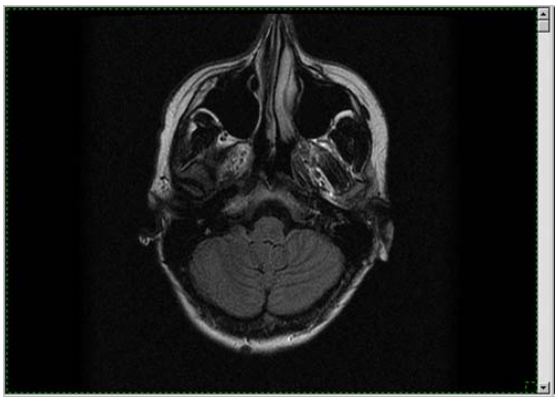
The explode mode changes the layout of a selected series so that it fills the entire main window, while the survey mode reverts to the original series display. This function is especially useful for skeletal surveys or any study that has multiple series.

To explode the series:

1. Select the required series.



2. Choose one of the following options:
   - On the **Tools** menu, click **Toggle Survey/Explode Mode**
   - Click
3. The selected series "explodes" to fill the entire main window.



Note: To return to the survey mode, click again.

The same functionality can be achieved for images within a series. Select an image and double-click it so that it fills the entire series pane. Double-click it again to return to the survey mode.

Using image fusion

eFilm Lite assumes image sets are registered in space — they will not adjust position to ensure alignment.

This section shows you how to:

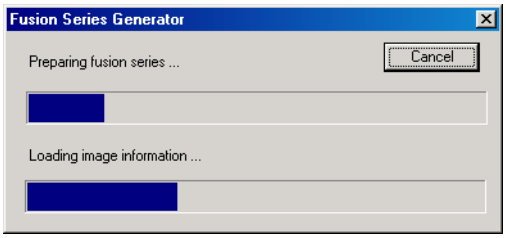
- fuse images from a two-modality image series together (see "Fusing images from two-modality image series" on page 44)
- adjust the Alpha setting (see "Adjusting the Alpha setting" on page 45)
- configure the image fusion pipeline (see "Configuring the image fusion pipeline" on page 45)

Fusing images from two-modality image series

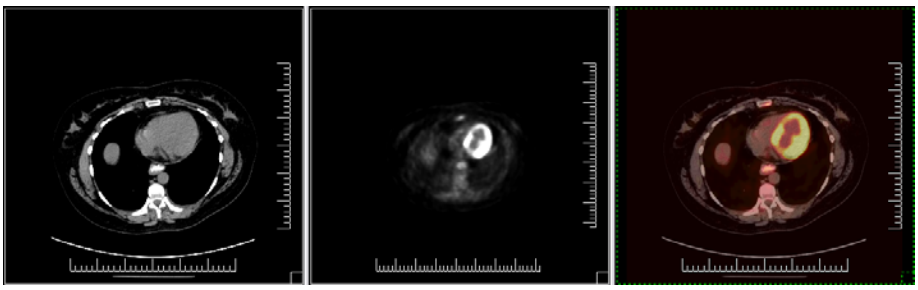
You can fuse two series from the same study together to combine CT images with PT images.

To fuse images from a two-modality image series together:

1. Open a study taken with CT and PT modalities.
2. Choose one of the following options:
   - On the **Tools** menu, click **Image Fusion**
   - Click
3. The *Fusion Series Generator* dialog box appears, which indicates the progress of the image fusion stage.



Once generated, the fused series appears in the right-hand pane of the main window, while the background series appears in the left-hand pane and the foreground series appears in the middle pane.



Note: The default settings of image fusion are that the PT images appear in the foreground and CT images appear in the background.

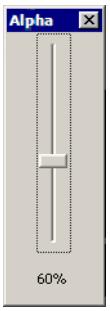
Adjusting the Alpha setting

The Alpha setting determines the blend value for the foreground and background of the fused image.

To adjust the Alpha setting:

1. Choose one of the following options:
   - On the **Tools** menu, click **Image Fusion**
   - Click the arrow to the immediate right of

   The *Image Fusion* pop-up menu appears.
2. Select **Alpha Blend** from the *Image Fusion* pop-up menu. The *Alpha* control bar appears.



3. Adjust the Alpha setting by dragging the scroll bar up or down.

Note: Any Alpha setting greater than 50% means more of the foreground image than the background will be contributed to the fused image; whereas any Alpha setting less than 50% means more of the background image will be contributed to the fused image than the foreground. The blend value will be saved in the current user's profile.

4. Click **X** in the upper-right corner to hide the *Alpha* control bar.

Configuring the image fusion pipeline

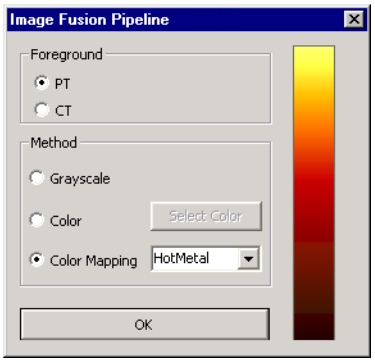
You can change the displayed color range of the fused image by configuring the image fusion pipeline.

To configure the image fusion pipeline:

1. Select the fused series viewport.
2. Choose one of the following options:
   - On the **Tools** menu, click **Image Fusion**
   - Click the arrow to the immediate right of

   The *Image Fusion* pop-up menu appears.

3. Select **Image Fusion Pipeline** from the *Image Fusion* pop-up menu. The *Image Fusion Pipeline* dialog box appears.



4. Specify the foreground as either **PT** or **CT**.
5. In the Method section, choose one of the following options:
   - **Grayscale**: displays the color range of the foreground as white to black.
   - **Color**: displays the color range of the foreground as varying shades of the color specified by clicking **Select Color** and selecting a color from the *Color* dialog box.
   - **Color Mapping**: displays the color range of the foreground as varying shades of the color specified by selecting a mapping from the drop-down list (e.g., Rainbow).

Note: The colored bar on the right offers a preview of the blend that will be applied to the fused series. All settings will be saved in the current user's profile.

The following table shows the default color mappings and corresponding colored bar that can be applied to the foreground image.

Color Mapping	Color Range Bar
HotMetal	
Rainbow	
Rainbow16	
Rainbow65	
Bronson	

6. Click **OK**.

Note: Advanced users can add new color mappings or modify existing ones from the **ColourMapping.txt** file in the installation folder. We recommend that you save a backup copy before editing this file.

Splitting a series

eFilm Lite can split a series that has overlapping images (such as a multi-phase series) into multiple series, one series per phase. You can set eFilm Lite to do this automatically (see "Customizing advanced user settings for a modality" on page 10)

Chapter 6: Annotating and Measuring Images

This section describes the annotation and measurement tools, which allow you to write on and measure images in a number of ways. In this chapter, you will learn how to:

- overlay text on an image (see "Overlaying text" on page 49)
- annotate an image (see "Annotating images" on page 50)
- make a linear measurement (see "Making linear measurements" on page 51)
- make an elliptical measurement (see "Making elliptical measurements" on page 52)
- draw an arrow on an image (see "Drawing arrows" on page 53)
- measure the angle between two lines on an image (see "Displaying angle measurements" on page 53)
-
- copy annotations and measurements to other images in a series (see "Copying annotations and measurements" on page 54)
- calibrate the measurement tools (see "Calibrating images" on page 55)
- determine the pixel or Hounsfield value of a point on an image (see "Probing images" on page 56)
- label a spine (see "Labeling a Spine" on page 57)
- clear the measurement annotations from an image (see "Clearing measurements" on page 59)

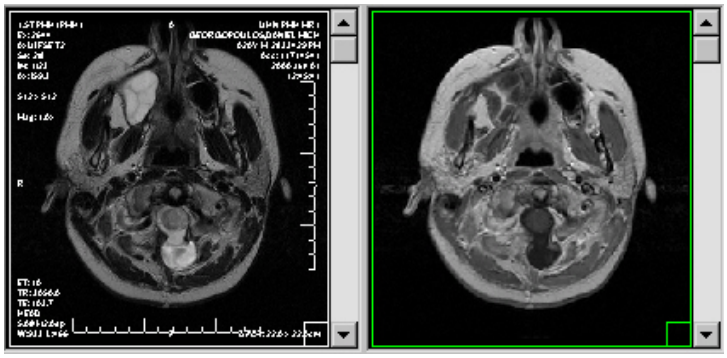
Overlaying text

Toggling the overlay hides or shows the displayed study information for a series and the scale marker.

To hide the written study information and scale marker:

1. Select a series.
2. Choose one of the following options:
   - On the **Tools** menu, click **Toggle Overlay**

- Click



To redisplay the written information, select the series and click again.

Note: If you applied lossy compression to the image, its identifier and compression ratio will not be hidden, even when this tool is off. Lossy compression information, where relevant, is always visible.

Annotating images

The annotation tool allows you to add text to images, and then edit or delete the text. Annotations can be added to an image to describe certain features in more detail. You can copy your annotations and measurements to other images in the study.

To add an annotation:

1. Select an image.
2. Choose one of the following options:
   - On the **Tools** menu, click **Add User Annotation**
   - Click
3. Click the area in the image where you want to add the annotation. A text field appears.
4. Type the annotation in the text field.
5. When completed, press **Enter**, or click again. The annotation is set in the image.

Note: Loading a different series into the series window after adding an annotation causes the annotation to be lost unless you have saved the image to a scrapbook or as a key image.

To edit an annotation:

- You can edit an annotation by selecting it and then editing the text as necessary. You can drag and drop the annotation anywhere on the image.

Annotations can be removed from an image if it is affecting the clarity of the image.

To delete an annotation:

1. Select the annotation.
2. Right-click and select **Delete**.

Note: To remove an annotation from all images in a series to which it was copied, select **Delete All** instead.

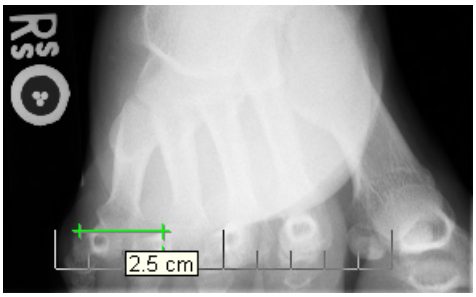
Making linear measurements

eFilm Lite allows you to make straight-line measurements on displayed images. On ES, OT, RF, SC, US, and XA images, measurements are displayed in pixels, until calibration is performed. In all other modalities, they are displayed in centimeters.

WARNING! Measurements performed on CR, DX, and MG images may be inaccurate unless you calibrate the measurement tools (see "Calibrating images" on page 55).

To make a linear measurement:

1. Choose one of the following options:
   - On the **Tools** menu, click **Measurement Tool - Line**
   - Click
2. Position the cursor at the starting location, and right-click and drag the cursor to the ending location.
3. Release the mouse button. A line with a distance measurement appears in blue.



You can stretch the line or move it to a new location. You can also move the measurement caption to a new location.

To stretch the line:

- Left-click either end of the line and drag it to a new location.

To move the line:

- Left-click anywhere on the line except at the ends and drag it to a new location.

To move the measurement caption:

- Left-click anywhere on the measurement caption and drag it to a new location.

Note: A line that appears in blue indicates that the line is selected and can be manipulated. An unselected line appears in orange.

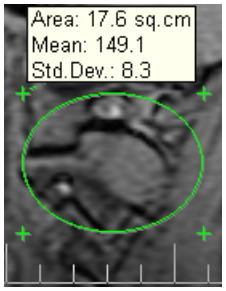
Making elliptical measurements

The Ellipse Measurement tool allows you to measure the area of a region of interest (ROI).

WARNING! Measurements performed on CR, DX, and MG images may be inaccurate unless you calibrate the measurement tools (see "Calibrating images" on page 55).

To make an elliptical measurement:

1. Choose one of the following options:
   - On the **Tools** menu, click **Measurement Tool - Ellipse**
   - Click
2. Position the cursor at the starting location, and right-click and drag the cursor to the ending location.
3. Release the mouse button. An ellipse with Area, Mean, and Standard Deviation measurements appears in blue.



You can stretch or move the ellipse to a new location. You can also move the measurement caption to a new location.

To stretch the ellipse:

- Left-click one of the corner markers (+) and drag-and-drop it to a new location.

To move the ellipse:

- Left-click anywhere on the ellipse and drag-and-drop it to a new location. The ellipse will turn blue and the cursor will change to a four-pointed arrow when the mouse is in position to move the ellipse.

To move the measurement caption:

- Left-click anywhere on the measurement caption and drag it to a new location.

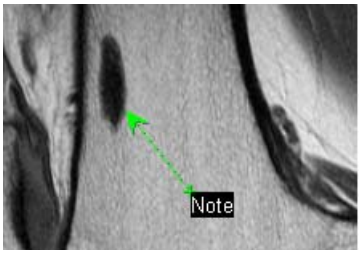
Note: An ellipse that appears in blue indicates that the ellipse is selected and can be manipulated. An unselected ellipse appears in orange. If the measurement caption has been moved independent of the ellipse, moving the ellipse no longer moves the measurement caption as well.

Drawing arrows

You can draw arrows to point to an area of interest on the image.

To draw an arrow:

1. Choose one of the following options:
   - On the **Tools** menu, click **Measurement Tool - Arrow**
   - Click
2. Position the cursor at the source (the arrow tail), and right-click and drag the cursor to the destination (the arrow head).
3. Release the mouse button. An arrow appears in green with an annotation box, in which you can enter notes.



You can stretch the arrow or move it to a new location.

To stretch the arrow:

- Left-click either end of the arrow and drag-and-drop it to a new location.

To move the arrow:

- Left-click anywhere on the arrow and drag-and-drop it to a new location.

Note: An arrow that appears in green indicates that the arrow is selected and can be manipulated. An unselected arrow will appear in orange. When moving the arrow, the annotation box does not move with it. To move the annotation box, click and drag the annotation to a new position on the image.

Displaying angle measurements

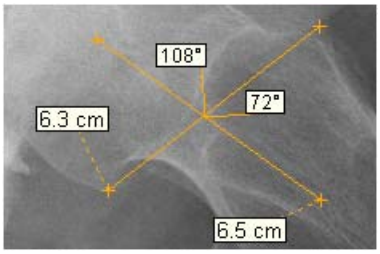
Angle measurements allow you to display the angles between intersecting lines.

To display the angle measurements:

1. Draw intersecting lines on the image.
2. Choose one of the following options:

- On the **Tools** menu, click **Measurement Tool - Show Angles**
- Click

The angles between any intersecting lines appear in orange.



Note: To toggle the display of the angle measurements off, click .

Note: In cases where lung bases are not horizontally aligned, the CTR calculation uses a horizontal diameter of the thorax rather than the diagonal measurement displayed.

WARNING! Due to limitations in data acquisition, the calculations are approximate.

Copying annotations and measurements

Once you have annotated and measured an image to your satisfaction, you can copy those annotations and measurements to other images in a multi-image study. This section describes how to:

- create a duplicate of an annotation or measurement on the same image
- copy an annotation or measurement to all images in a multi-image series

To duplicate an annotation or measurement:

1. Right-click the annotation or measurement and select **Copy**. A copy of the selected annotation or measurement appears on the current image.
2. Reposition and edit the new annotation or measurement

To copy an annotation or measurement to another image:

1. Mouse over the annotation or measurement you want to copy. It will turn blue once you can select it.
2. Right-click and select **Copy To All**. The annotation or measurement should now appear on all images in the series.

Note: By default, **Move All** is selected. In this mode, moving an annotation or measurement on one image will move it on all images in the series. Select **Move** to be able to adjust annotations or measurements individually. If you reselect **Move All**, the other images in the series will be changed to match the current image.

Calibrating images

Calibrating allows you to manually specify the image pixel size for images which are not automatically calibrated or which you want to recalibrate due to magnification errors. Only CT and MR studies are automatically calibrated accurately; all other studies should be calibrated manually.

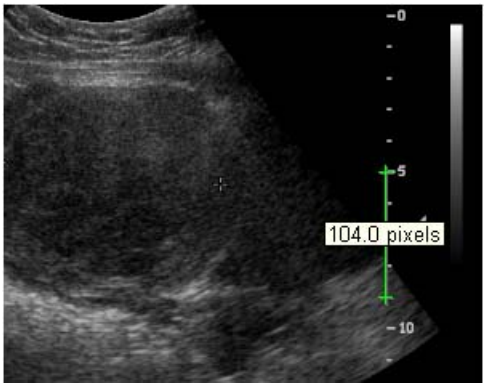
WARNING! Measurements performed on CR, DX, and MG images may be inaccurate unless you first calibrate the measurement tools.

To calibrate an image:

1. Select the image you want to calibrate, and follow the procedure outlined in "Making linear measurements" on page 51 to create a line overlaying a bit of the scale to the right of the image.
2. Count how long the line is according to the scale (in this example, the line is 4 hashmarks long).

   Note: Ultrasound image scales correspond to 1 cm between each hashmark.

3. Select the line by right-clicking anywhere on it. The line appears in blue.



4. Choose one of the following options:
   - On the **Tools** menu, click **Calibrate Measurements**
   - Click

   The *Measurement Calibration* control bar appears.
5. Enter the length in centimeters of the line you drew, as measured by the scale on the image, and click **OK**.

All subsequent measurements on the image will be calibrated.

Note: Due to variable scaling per image, each image must be calibrated individually.

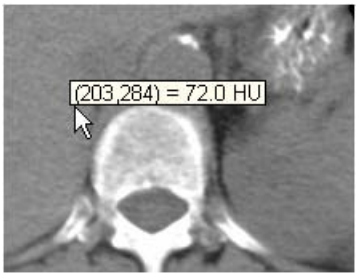
Once an image is calibrated, you can change its measurement units back to pixels by entering `0` as the length value in the *Measurement Calibration* control bar.

Probing images

Probing allows you to query the image intensity values.

To probe the area of an image:

1. Choose one of the following options:
   - On the **Tools** menu, click **Probe Tool**
   - Click
2. Click anywhere on the image and hold the mouse button down to view the value at that point. The Hounsfield value (for CT) or pixel value (for all other modalities) is displayed.



Labeling a Spine

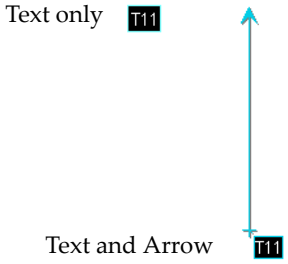
You can label the vertebrae of a spine using predefined annotations. You can use text annotations, or text annotations with adjustable arrows. The predefined annotations refer to the spinal column as follows:

- C1 to C7 — Cervical vertebrae 1 to 7
- T1 to T12 —Thoracic vertebrae 1 to 12
- L1 to L5 — Lumbar vertebrae 1 to 5
- S1 to S5 — Sacrum vertebrae 1 to 5

This feature is only available for MR and CT images.

To label a spine:

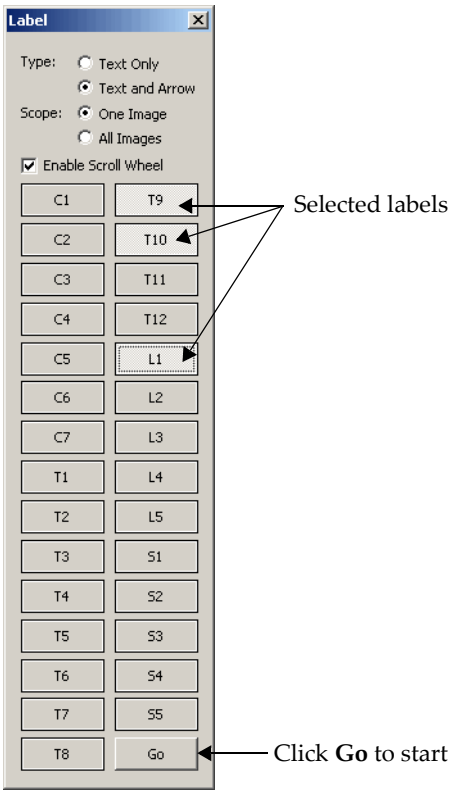
1. Select a series.
2. Choose one of the following options:
   - On the **Tools** menu, click **Label**.
   - Click
3. In the Type section, select the type of labeling: Text only or Text and Arrow.



4. In the Scope section, select how the application should apply the labels:
   - **One Image** — Select this option if you want the application to only apply the labels to the current image.
   - **All Images** — Select this option if you want the application to apply the labels to all images within the series.
5. Choose one of the following:
   - Select the **Enable Scroll Wheel** check box if you do not want to preselect the labels. This option allows you to access all labels by scrolling the mouse wheel. After you select this check box, click **C1** and click **Go**.

Note: If you select this option, you cannot scroll through the images in the series using the mouse wheel.

- Click the desired labels to select them. Once you are finished, click **Go**.



6. If you selected **Text only** in Step 3, click in the image to insert the text label in the desired location. If you selected **Text and Arrow** in Step 3, position the arrow head by the desired location, then click in the image.

Note: If the viewport is not currently displaying the desired image, you can roll the mouse wheel to scroll to the desired image before inserting the label.

Note: If you selected **Enable Scroll Wheel** in Step 5, scrolling the mouse wheel only changes the label attached to your cursor. Scroll the mouse wheel until it displays the desired label, then insert the label in the image.

---

7. Once you have inserted one label in the image, the application attaches the next label to your cursor. Repeat Step 6 until you have inserted all the selected labels.

Note: The application attaches the labels to your cursor in sequential order (e.g., T 9, then T10, then T11 and so on).

Note: If you selected **Enable Scroll Wheel** in Step 5, double-click to insert your last label.

---

8. You can do the following:
   - Change the angle of the arrow (see "To change the angle of an arrow:" on page 59).
   - Reposition the label (see "To reposition a label:" on page 59).
   - Edit the label (see "To edit a label:" on page 59).

To change the angle of an arrow:

- You can change the angle of the arrow at any time.
  - To change the angle of an arrow, click and either endpoints of the arrow its new position.
  - To insert and change the angle of the arrow at the same time, position the arrow head at the desired location, then click and drag to draw the angle of the arrow.

To reposition a label:

- You can reposition both the location of the arrow and the text annotation.
  - Point your cursor over the arrow or the text annotation.
  - When your cursor changes to , click and drag the item to its new location.

To edit a label:

1. Double-click the text annotation.
2. When the background of the text annotation changes from black to white, and the cursor is a blinking I-beam in the text annotation, type the new annotation.
3. When you are finished, click outside the text annotation.

Clearing measurements

If you do not want any measurements on the images of a series, you can remove them all at once.

To delete all the measurements from every image in a series:

1. Select a series.
2. Choose one of the following options:
   - On the **Tools** menu, click **Clear Measurement Tools**; or
   - Click .

To delete a single measurement from the current image:

1. Select the measurement you want to remove.
2. Right-click and select **Delete**.

Note: To remove the measurement from all images in a series, select **Delete All**.

Chapter 7: Creating 3D Images

This section covers the creation of Maximum Intensity Projection (MIP), volume rendered, Multi-Planar Reformatting (MPR), and Simgram images, which allow you to view and manipulate volumes in three dimensional display. In this chapter, you will learn:

- about the volume rendering techniques supported by eFilm Lite (see "3D modes" on page 61)
- how to create 3D volumes (see "Creating 3D images" on page 62)
- how to create MPR images (see "Creating MPR views" on page 71)

Note: Some 3D operations require specific hardware.

3D modes

eFilm Lite includes several 3D imaging techniques:

- Multi-Planar Reformatting (MPR): reformatting technique that passes a plane through a data set, so that you can view the volume along a different direction than that of the original images. In effect, you can view the image data from different viewpoints without having to rescan the patient.

  Note: MPR views are normally only created from a 2D dataset; however, if volume rendering is **not** available (see below) you will be able to create an MPR view from a 3D volume.

- Maximum Intensity Projection (MIP): interpolation technique that passes rays through a data set, that finds and displays the maximum intensity pixel value along each ray. This value is used as the final pixel value for the ray. You can rotate, crop, and window/level an MIP.
- Volume Rendering: this technique projects a volume onto a screen image pane, assigning colors based on an opacity map. The opacity map determines how opaque each intensity value should be rendered, and which color the value contributes to the resulting image.

  Note: Volume rendering is only available on computers that have compatible video cards. If volume rendering is not available, you will instead be able to create an MPR view from a 3D volume.

- Simgram™ Image: mode that uses Holorad's patented Simgram algorithm to simulate the appearance of a holographic 3D Voxgram® image on your 2D screen. You can rotate, crop, and window/level a Simgram image.

Note: 3D functionality is only supported for CT and MR studies, because only these types of studies contain orientation information on slices.

WARNING! MPRs, MIPs, Volume rendered and Simgram images are intended for use as adjuncts to two-dimensional medical imaging display techniques. The above techniques involve interpolation of data. Reference should always be made to the original two-dimensional images and the modality parameters when interpreting the data.

Caution: To improve responsiveness, the volume first displays at a reduced resolution, as indicated by the Reduced Resolution message in the overlay. Before interpreting the data, please wait for the volume to refine to Full Resolution.

Using 3D images

This section describes how to create, configure, and manipulate Maximum Intensity Projection (MIP), volume rendered, and Simgram images. In this section, you will learn how to:

- create a 3D image (see "Creating 3D images" on page 62)
- adjust the loading parameters for 3D images (see "Adjusting loading parameters for 3D volumes" on page 64)
- crop 3D images (see "Cropping 3D volumes" on page 65)
- rotate 3D images (see "Rotating 3D volumes" on page 66)
- view 3D images in stereo display mode (see "Viewing 3D images in stereo display mode" on page 67)
- set all pixels outside the conventional window to black (see "Using the black outside window setting" on page 67)
- adjust mapping settings for volume rendered images (see "Adjusting mapping settings for 3D volumes" on page 68)

Creating 3D images

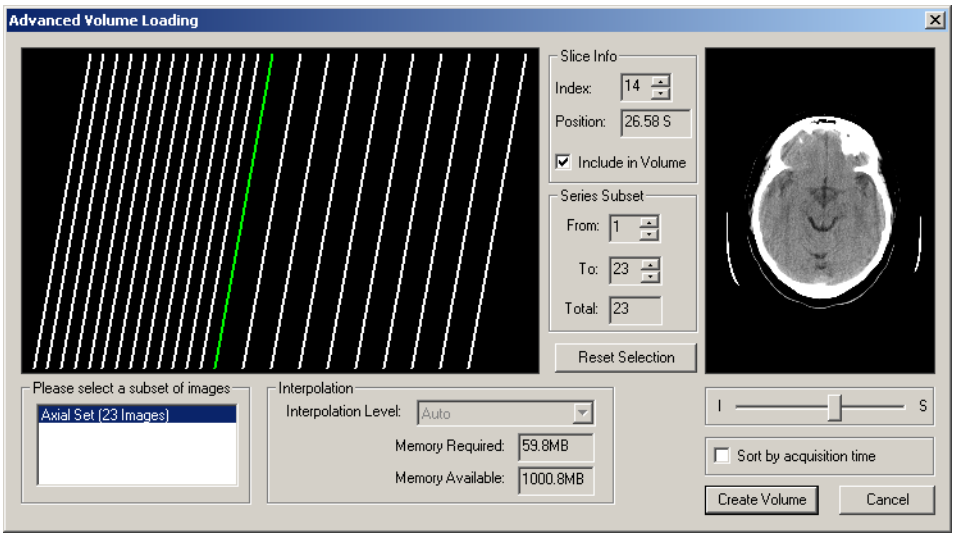
This method allows you to create an MIP, volume rendered, or Simgram image as a 3D volume.

To create a 3D image:

1. Select the required series.
2. Choose one of the following options:
   - On the **Tools** menu, click **View 3D Options**
   - Click the arrow to the immediate right of

   The *View 3D* pop-up menu appears.

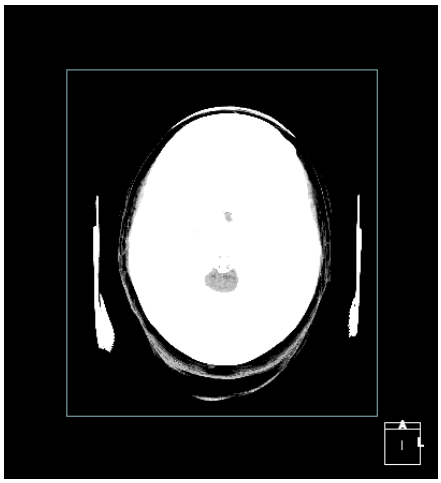
3. Select either **MIP**, **Volume**, or **Simgram Image** as the 3D mode. The *Advanced Volume Loading* dialog box appears.



Note: The selected 3D mode becomes the default mode until you choose another. This means you can access the Advanced Volume Loading dialog box directly by clicking the View 3D button or selecting **Tools > View 3D**.

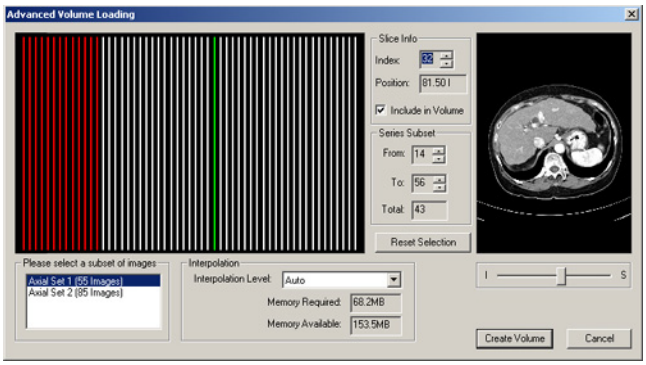
4. Adjust the loading parameters (see "Adjusting loading parameters for 3D volumes" on page 64), and click **Create Volume**. The 3D image appears in the main window.
5. (Optional) Export the 3D volume in AVI format (see "Exporting volumes to AVI files" on page 81).

Note: If you are creating a volume rendered image, you may want to adjust the color or grayscale opacity mappings and recreate the volume. See "Adjusting mapping settings for 3D volumes" on page 68 for information on working with opacity maps.



Adjusting loading parameters for 3D volumes

The *Advanced Volume Loading* dialog box allows you to alter the default volume loading parameters that would normally be hidden or automatically chosen by the software. For example, you can specify the amount of interpolation to be used, or select to load only a subset of images from a series.



The top left window provides a graphical representation of the slice distribution of the series and indicates which slices are available for inclusion in the volume. White slices are included, red slices are excluded, and the green slice is the currently selected slice in the thumbnail display.

The top right window displays thumbnails of the slices in the series. You can drag the slider to browse through all available slices. As you adjust the slider to browse through the slices, the thumbnail, Slice Info, and which slice is highlighted in green are updated to correspond with the selected slice.

To select only a subset of slices to include in the volume:

1. In the **Series Subset** area, use the **From** and **To** spinners to narrow the range of images that are used to create the volume.
2. To exclude only a particular slice instead of a range, browse through the available slices until you reach the one you want to exclude. Under **Slice Info**, clear the **Include in Volume** check box.
3. Click **Reset Selection** to return to the default setting of including all the slices in the volume.

Note: The following parameters can optionally be adjusted to improve the result.

To adjust the loading parameters:

1. If a series contains multiple orientations or phases, select a different orientation or phase to use to create the volume.
2. Select a different **Interpolation Level** to use to create the volume.

   By default, **Auto** is selected. This option automatically selects the best interpolation pixel spacing that can be handled by your current memory availability.

Note: The **Memory Required** box displays the memory required to load the volume with the currently selected slices and interpolation settings. Compare this value to the **Memory Available** box, which displays the total memory currently available on your system. If the **Memory Required** exceeds the **Memory Available**, you cannot load the volume using the current settings. In this case, you must reduce the number of slices you are attempting to use.

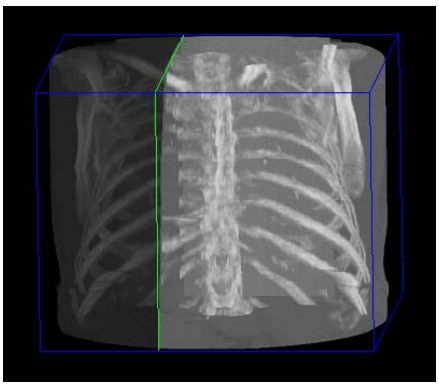
3. Select the sort by **Acquisition**.

Cropping 3D volumes

Cropping allows you to crop a volume in all three dimensions. This feature allows the user to identify a volume-of-interest and remove the other parts of the volume from the display.

To crop a volume:

1. Choose one of the following options:
   - On the **Tools** menu, click **Crop Volume**
   - Click
2. Using the sides of the blue volume cube as your cropping planes, position the cursor over the edge of the cube you want to crop. Click and drag the cursor in the direction you want to crop.
3. Release the mouse button to set the new boundary of the cropped volume cube.



The following notes pertain to both the 3D rotating and cropping tools:

- The left mouse button is used for 3D rotating and cropping. Rotating is the default active tool. As you move the cursor over the edge a cropping plane, the cursor shape changes to the cropping symbol, indicating that the cropping tool is now the active tool.
- When in crop mode, the highlighted plane indicates the side of the cube that will be resized when you click and drag the mouse.
- The cropped volume cube appears in green.
- You can combine cropping, rotating and windowing in any order. At first, you may find it easier to crop in one of the preset rotations: **Anterior**, **Posterior**, **Left**, **Right**, **Superior**, or **Inferior**, which are outlined in "Rotating 3D volumes" on page 66.

- While cropping, all parts of the volume outside of the cropped volume are displayed at a reduced brightness to help you understand the context of what is in and what is out. Once you have finished cropping, toggle the crop icon to display only the cropped-in volume.

4. Since the cropped volume is smaller, it can be rendered faster. To improve rendering speed, once you have cropped your volume, click to display only the cropped volume.

Note: You can reset the crop by clicking **Reset** on the *Crop Volume* pop-up menu.

Rotating 3D volumes

There are two ways to rotate a volume: manually or preset selection.

To rotate the volume manually:

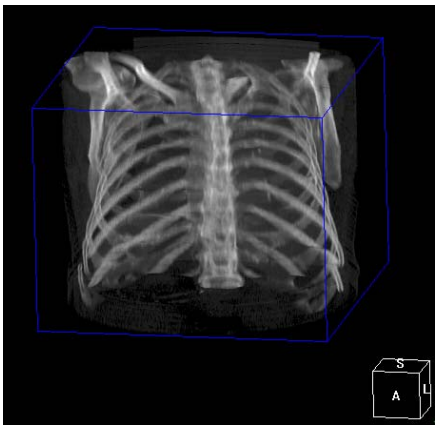
1. Choose one of the following options:
   - On the **Tools** menu, click **Rotate Volume**
   - Click
2. Position the cursor over the volume, left-click and drag the cursor over the volume.

   The volume rotates in the direction of the mouse movement.
3. Release the left mouse button to set the volume at the new rotation.

To use the preset rotations:

1. Select the volume.
2. Choose one of the following options:
   - On the **Tools** menu, click **Rotate Volume**
   - Click the arrow to the immediate right of

   The *Rotate Volume* pop-up menu appears.
3. Select either **Anterior**, **Posterior**, **Left**, **Right**, **Superior** or **Inferior** to rotate the volume to one of the standard anatomical orientations.



The cube in the bottom right corner of the image pane shows the current rotation of the volume.

Note: You can also use the Flip Horizontal/Vertical and Rotate 90 Degrees Clockwise/ Counter Clockwise tools to change the orientation of the image, as outlined in "Changing image orientation" on page 39.

Viewing 3D images in stereo display mode

By default, the rendered volume displays as a monoscopic image. Displaying the image in stereoscopic mode removes ambiguity between front and rear anatomical structures. All 3D operations can be done in stereo mode, including rotating, cropping, and windowing. You will need a pair of red/blue anaglyphic glasses to view the stereo display. Ensure that the red lens goes over your left eye. You can view the stereo effect with anaglyphic glasses that have the red lens over the right eye by entering a negative value for the **Stereo Angle** on the *Volume Settings* tab of the *Edit Properties* dialog box (see "Customizing volume settings" on page 15).

Important: You cannot rely on this mode when making clinical decisions. Stereo effect has significant limitations, depending on your position relative to the screen. As you move left or right, up or down, the stereo volume will warp. As you move closer or further away, the stereo volume will shrink or expand respectively. If you turn your head so one eye is above the other, the stereo effect will vanish.

To view the volume in stereo mode:

1. Choose one of the following options:
   - On the **Tools** menu, click **Toggle Stereo**
   - Click
2. To change the strength of the stereo effect, adjust the stereo display settings by following the procedure outlined in "Customizing volume settings" on page 15.
3. To toggle the stereo display off, click again.

Note: You cannot activate the volume MPR tool while in stereo mode (see "Creating MPRs from 3D volumes" on page 73).

Using the black outside window setting

This setting causes all pixel values above and below the conventional window to be set to 0 for the purpose of 3D rendering, and appear black in the 3D image. This feature can be useful in soft-tissue CT images to "remove" the skull or ribs from the display.

To zero all pixel values outside the conventional window:

1. Choose one of the following options:
   - On the **Tools** menu, click **View 3D Options**
   - Click the arrow to the immediate right of

   The *View 3D* pop-up menu appears.
2. Select **Black Outside Window**.

Adjusting mapping settings for 3D volumes

You can assign either color and grayscale mappings to 3D volumes, as well as load, edit and delete mappings of both types.

Note: These settings only apply to volume rendered 3D images, not MIP or Simgram images.

This section shows you how to:

- assign color mappings to a 3D volume (see "Assigning color mappings to 3D volumes" on page 68)
- assign grayscale mappings to a 3D volume (see "Assigning grayscale mappings to 3D volumes" on page 69)
- load either color or grayscale mappings (see "Loading color/grayscale mappings" on page 70)
- edit or delete either color or grayscale mappings (see "Editing color/grayscale mappings" on page 70)

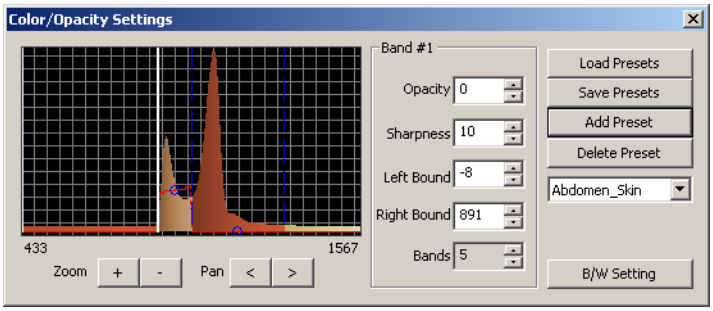
Assigning color mappings to 3D volumes

The Opacity Settings tool allows you to assign color mappings to ranges within a CT or MR study. This feature is only available for volume rendering; it will not function with Simgram or MIP images.

To assign color mappings to a range in the study:

1. Select the required study.
2. Choose one of the following options:
   - On the **Tools** menu, click **Opacity Settings**
   - Click

   The *Color/Opacity Settings* dialog box appears.



3. Click the **+** or **–** buttons to zoom in or out on the graph, and the **<** or **>** buttons to pan left or right.

   Note: The **Pan** options become available once you zoom in.

4. Select the number of bands for the series. Bands define the range of values in a data set to which specific colors can be assigned. This is useful in highlighting different types of tissue for diagnostic purposes. The number of bands is limited to 20.

5. Select a band range between the blue dashed lines. The current range bounds appear in white.
6. Double-click the selected range. The *Color* dialog box appears.
7. Select a basic color or create your own custom color to use as the new color mapping.
8. To create a custom color, use the color selector on the right, or adjust the RGB values directly, and then click **Add to Custom Colors**.
9. Click **OK** to save your changes, or click **Cancel** to exit without saving any changes.
10. Adjust the **Left Bound** and **Right Bound** values by entering them manually or using the spinbox arrows. These values define the boundaries for each band range.
11. Adjust the **Opacity** and **Sharpness** values by entering them manually or using the spinbox arrows. **Opacity** illustrates the intensity of the color value. **Sharpness** illustrates the clarity of the color value.
12. Click the **X** in the upper right-hand corner to close the *Color/Opacity Settings* dialog box. The image is updated according to the new color mapping.

Note: To save these settings to the *Preset* menu, follow the procedure described in "Editing color/grayscale mappings" on page 70.

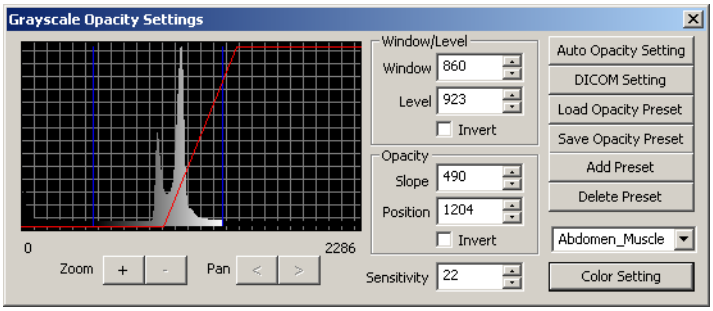
Assigning grayscale mappings to 3D volumes

The Opacity Settings tool allows you to assign grayscale mappings to ranges within a CT or MR study. This feature is only available for volume rendering; it will not function with Simgram or MIP images.

To assign grayscale mappings to a range in the study:

1. Select the required study.
2. Choose one of the following options:
   - On the **Tools** menu, click **Opacity Settings**
   - Click

   The *Color/Opacity Settings* dialog box appears.
3. Click **B/W Setting**. The *Grayscale Opacity Settings* dialog box appears.



4. Click the **+** or **–** buttons to zoom in or out, and the **<** or **>** buttons to pan left or right.

Note: The **Pan** options become available once you zoom in.

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5. Adjust the **Sensitivity** value by entering it manually or using the spinbox arrows. The **Sensitivity** value specifies the increment by which the **Window/Level** and **Opacity**

spinbox values will change when adjusted. You can also set this value by following the procedure outlined in "Adjusting manual window/level control sensitivity" on page 34.

6. Adjust the **Window** and **Level** values by entering them manually or using the spinbox arrows. Select the **Invert** check box to switch the **Window** value from white to black. Clear the **Invert** check box to switch this value from black to white.
7. Adjust the **Opacity Slope** and **Position** values by entering them manually or using the spinbox arrows. Select the **Invert** check box to switch the **Slope** value from white to black. Clear the **Invert** check box to switch this value from black to white.
8. Click **Auto Opacity Setting** to automatically create a straight opacity angle, or **DICOM Setting** to revert to the Window/Level settings defined in "Specifying custom window/level values" on page 35.

Note: To save these settings to the *Preset* menu, follow the procedure described in "Editing color/grayscale mappings" on page 70.

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9. Click the **X** in the upper right-hand corner to close the *Grayscale Opacity Settings* dialog box. The image is updated according to the new grayscale mapping.

Loading color/grayscale mappings

A number of predefined color and grayscale mappings (grouped by anatomical regions) are available, which you can load from the *Preset* menu.

To load color or grayscale mappings from the *Preset* menu:

1. Choose one of the following options:
   - On the **Tools** menu, click **Opacity Settings**
   - Click

   The *Color/Opacity Settings* dialog box appears.
2. Select the color mapping name from the drop-down list, and click **Load Presets**.

Note: If you are using **B/W Setting**, the presets displayed will produce grayscale images (see "Assigning grayscale mappings to 3D volumes" on page 69).

Editing color/grayscale mappings

To edit color or grayscale mappings:

1. Load the color or grayscale mapping that you want to edit (see "Loading color/grayscale mappings" on page 70).
2. Click **Add Preset**. The *Edit Dialog* dialog box appears.
3. Modify the **Opacity Name**, and click **OK**.
4. Click **Save Presets**.

   The color or grayscale mapping is added to the **Preset** drop-down list.

Note: To remove a color or grayscale mapping, select it and click **Delete Preset**.

Creating MPR views

Multi-Planar Reformatting is a technique that passes a plane through a data set, so that the user can view the volume from a different direction than that of the original images. In effect, you can view the image data from different viewpoints without having to rescan the patient.

You can create MPR views of an existing data set from either 2D images or 3D volumes. From a 2D image, the MPR view you generate creates a viewing plane that is perpendicular to the image plane. From a 3D volume, the MPR view you generate creates a viewing plane that can be rotated to any angle relative to the original image plane.

Note: You can only generate MPR views of a 3D volume if your system does **not** meet the hardware requirements to support volume rendering.

You can construct:

- MPRs of the two orthogonal viewing planes from a 2D image
- an MPR of an arbitrary perpendicular viewing plane from a 2D image
- an MPR of an arbitrary viewing plane through a 3D volume

Once created, an MPR series behaves the same as a regular eFilm Lite image series. You can use most of the eFilm Lite tools, such as window/level, stack, zoom, pan, measurements, and reference lines, on the MPR series. However, you cannot apply any 3D image tools to the MPR series until it is saved to the database.

Note: Once an MPR series has been saved and closed, you can reopen it and apply 3D image tools to it (see "Saving and deleting MPR views" on page 77).

In this section, you will learn how to:

- create MPRs of the two orthogonal viewing planes from a 2D image (see "Creating Orthogonal MPR viewing planes" on page 72)
- create MPRs of an arbitrary perpendicular viewing plane from a 2D image (see "Creating MPRs from 2D images" on page 73)
- create MPRs of an arbitrary viewing plane through a 3D volume (see "Creating MPRs from 3D volumes" on page 73)
- interact with the MPR series you have created (see "Interacting with MPR series" on page 74)
- adjust your view of the MPR (see "Adjusting the MPR view" on page 74)
- create a slab from the MPR view (see "Creating MPR slabs" on page 77)
- save or delete the MPR view (see "Saving and deleting MPR views" on page 77)

Creating Orthogonal MPR viewing planes

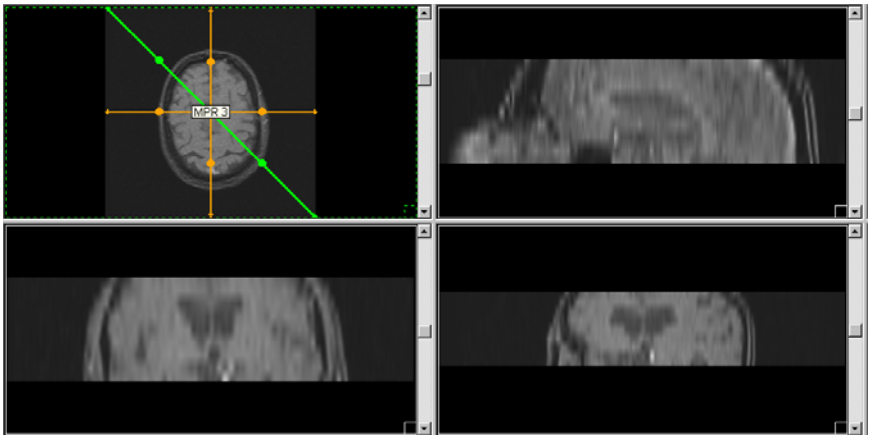
The Auto-Generate MPR tool allows you to automatically create three MPR views: two orthogonal MPR views that are perpendicular to the image plane, and an oblique view that is at 45° to the other two views.

Note: The oblique view is optional; you can set eFilm Lite to create or omit this view in the *Edit Properties* dialog box (see "Customizing volume settings" on page 15).

To automatically create MPR views:

1. Select the appropriate series.
2. Choose one of the following options:
   - On the **Tools** menu, click **Auto-Generate Orthogonal MPR Tools**
   - Click

   The MPR views are generated and the screen layout is automatically adjusted to 2 x 2 (unless four viewports are already configured), displaying the original series in the top left corner and the three MPR series in adjacent viewports. The oblique view, if generated, is shown in the lower right viewport.



Note: You can adjust your MPR view by manipulating the MPR lines (see "Adjusting the MPR view" on page 74).

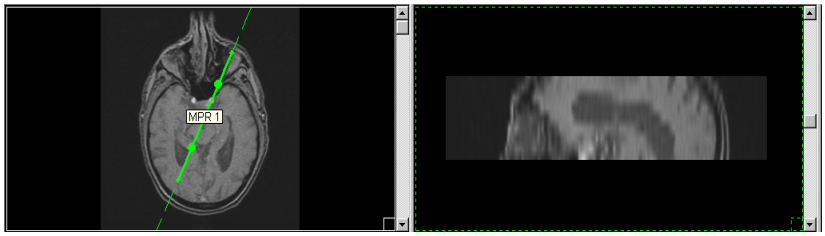
3. With the original series selected, click again to remove these lines and corresponding views.

Creating MPRs from 2D images

The MPR tool allows you to create an arbitrary MPR view from a two dimensional image.

To create an arbitrary MPR view from a 2D image:

1. Select the appropriate series.
2. Choose one of the following options:
   - On the **Tools** menu, click **Measurement Tool - MPR**
   - Click
3. Position the cursor at the starting location, and right-click and drag the cursor to define the viewing plane.
4. Release the mouse button. A line appears in green, which represents a perpendicular plane passing through the data set to create the MPR viewing plane.



Creating MPRs from 3D volumes

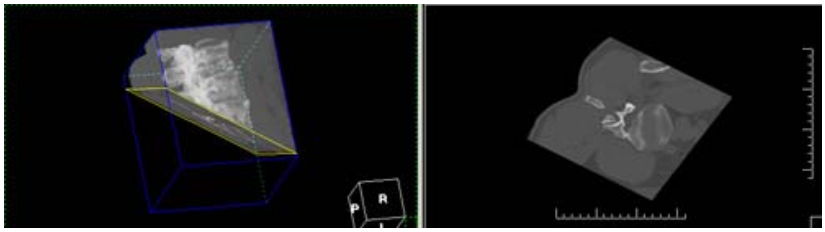
The MPR Volume tool creates an MPR view from a three dimensional volume.

Note: You can only generate MPR views of a 3D volume if your system does **not** meet the hardware requirements to support volume rendering.

Note: You cannot enter stereo mode while the volume MPR tool is active (see "Viewing 3D images in stereo display mode" on page 67).

To create an MPR view from a 3D volume:

1. Follow the procedure outlined in "Creating 3D images" on page 62 to create a MIP or Simgram image.
2. Choose one of the following options:
   - On the **Tools** menu, click **Volume MPR**
   - Click



Note: With the original series selected, click MPR again to remove the MPR plane and the corresponding MPR view. If you want to save the MPR view, remove the MPR plane.

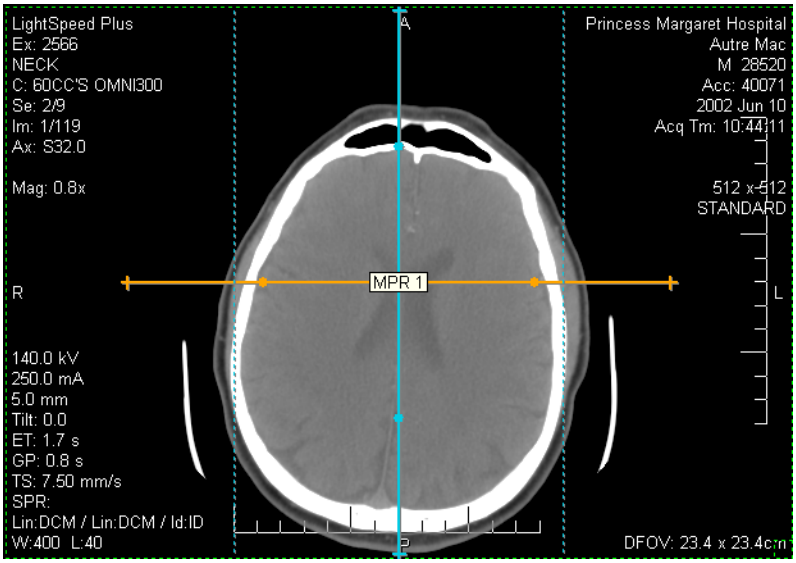
Interacting with MPR series

The following notes pertain to creating an MPR view from both a 2D image and a 3D volume:

- The MPR series that you created are added to the right-click context menu for the selected study. To view an MPR series, right-click in an open pane and select the MPR series.
- If you right-click on the series that contains the MPR line and select a different series to load into that pane, you will be prompted to save or delete the corresponding MPR as a series view.
- If you close the study prior to saving the MPR series, the MPR series will be lost and will need to be recreated when you reopen the study.
- You can adjust your MPR view by manipulating the MPR lines (for 2D images) or by manually rotating the plane independent of the volume, by highlighting the plane to select which item you want to rotate (for 3D volumes). For details, see "Adjusting the MPR view" on page 74.
- You can adjust the slice separation used to create your MPR view on the *Volume Settings* tab of the *Edit Properties* dialog box (see "Customizing volume settings" on page 15).

Adjusting the MPR view

Each of the two MPR views is represented by three lines: the MPR line itself and a pair of range lines. The MPR line defines the "slice" through the volume shown by that line's MPR view, and the range lines define the number of images in the view.

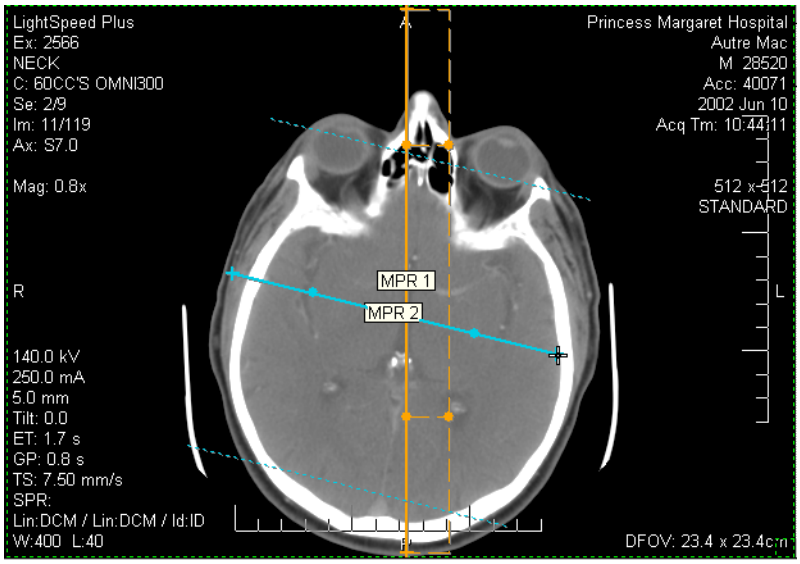


You can adjust the MPR view in several ways:

- rotate and resize the MPR line: this adjusts the size and angle of the MPR view, allowing you to focus on a particular area of the screen
- reposition the MPR line
- adjust the range lines to restrict the number of images in the MPR view

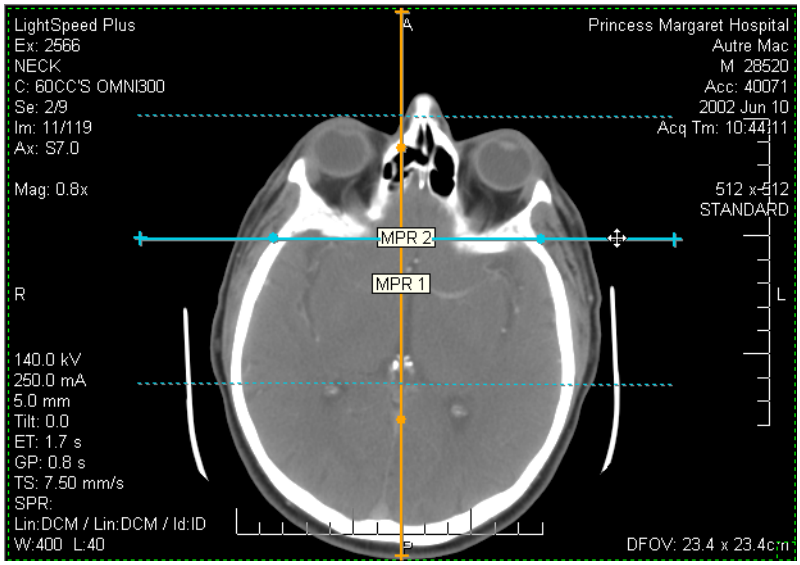
To rotate or resize the MPR line:

1. Left- or right-click either end of the MPR line. The cursor changes to a + and the line changes color from orange to green.
2. Drag and drop the end to the new location.



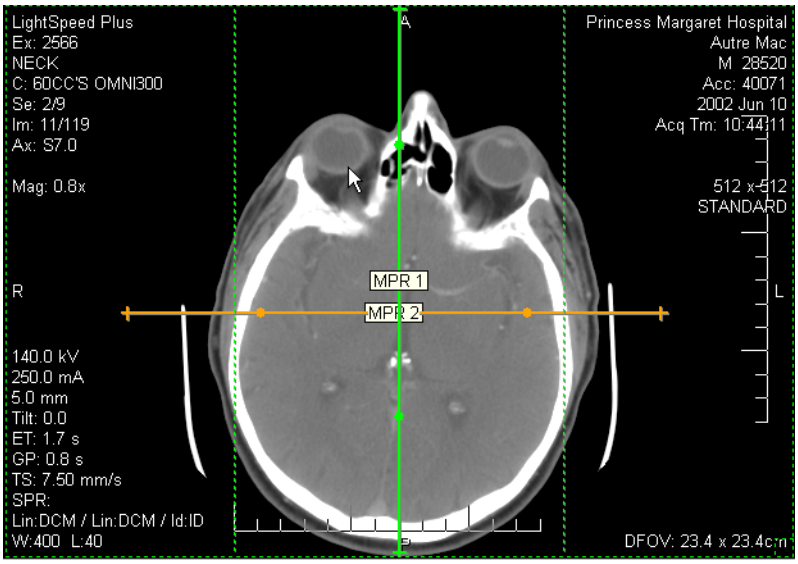
To move the MPR line:

1. Left- or right-click anywhere on the MPR line. The cursor changes to a four-headed arrow and the line changes color from orange to green.
2. Drag and drop the line to the new location.

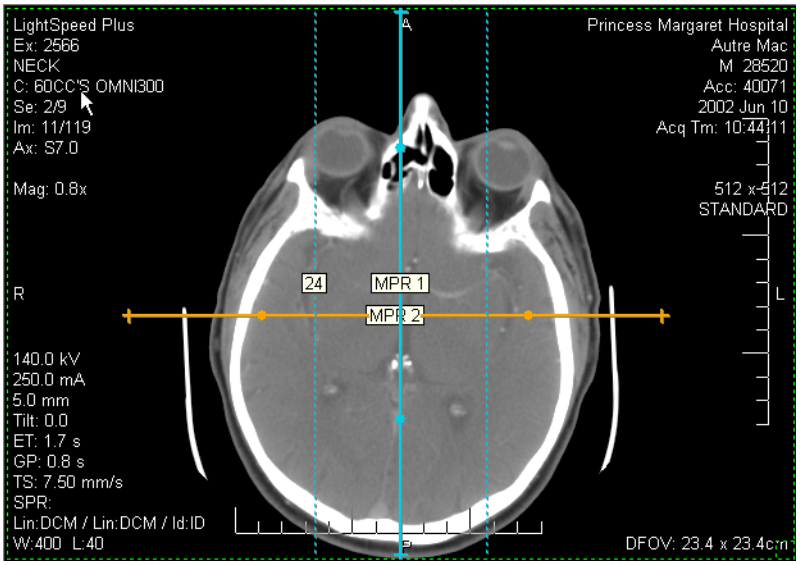


Adjusting the MPR range:

1. Left- or right-click anywhere on one of the range lines (the dotted lines on either size of the MPR line). The line changes from orange to green.



2. Drag and drop the line to the new location.



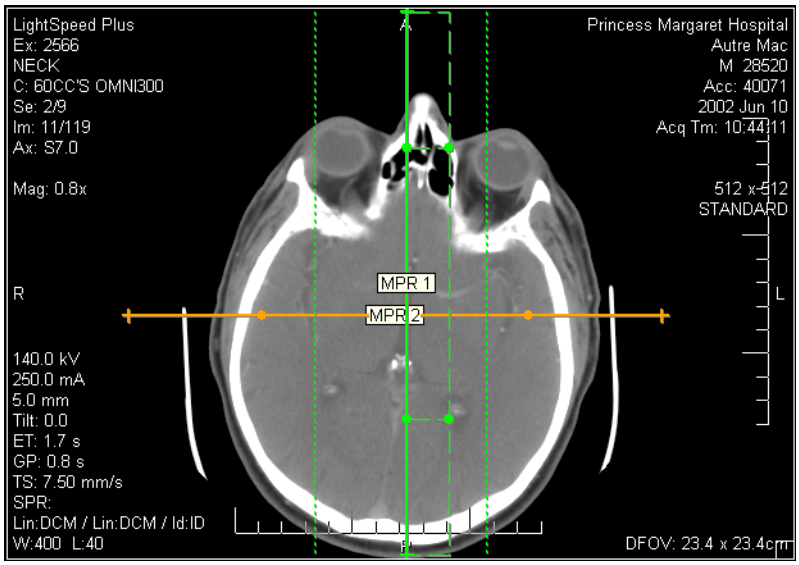
You can also move the MPR line by stacking through the slices on the MPR view. As you stack through the slices, the MPR line is dynamically updated to reflect the new viewing plane on the original image.

Creating MPR slabs

MPR slabs add depth to MPR slices.

To create an MPR slab:

1. Left- or right-click one of the circular nodes on an MPR line. The line changes from orange to green.
2. Drag and drop the node to the new location. This specifies the thickness of the slab.



Note: As you are changing the thickness of the slab that defines the MPR plane, the corresponding MPR view is dynamically updated. The MPR view is now an MIP of the portion of the stack defined by the slab.

Saving and deleting MPR views

You can choose to delete an MPR view, or save it as an additional series in the study. Once saved, the new MPR series can be sent to another device or reopened for viewing, as you would any other eFilm Lite series.

To save or delete an MPR view:

1. Select the MPR line and press **Delete**. A message box appears.

   Note: You can delete all MPR lines and views from a series by selecting the series and clicking . You will be prompted to delete each MPR view; you can click **No to all** in the message box that appears to avoid multiple prompts.

2. Choose one of the following options:
   - Click **No** to delete the MPR line and the MPR view.
   - Click **Yes** to save the series. For local exams, the *Store MPR Series* box appears in a new pane.
3. Type a series description for the MPR view and click **OK**.

Note: If you right-click a series that contains an MPR line and select a different series to load into that pane, you will be prompted, as described above, to save or delete the corresponding MPR view.

Chapter 8: Exporting Images

eFilm Lite can output images in a variety of formats. In this chapter, you will learn how to:

- copy and paste an image into a Microsoft Windows document (see "Copying and Pasting Images" on page 79)
- export images as JPEG files (see "Exporting images as graphic files" on page 79)
- export images as AVI files (see "Exporting images to AVI files" on page 80)
- export volumes as AVI files (see "Exporting volumes to AVI files" on page 81)
- print images (see "Printing images" on page 82)

Copying and Pasting Images

You can copy and paste an image from a viewport into a Microsoft Windows application (e.g., Microsoft Word). The copied image retains all applied annotations and measurements.

To copy and paste an image:

1. Select the viewport with the image you want to copy.
2. Choose one of the following:
   - On the **Edit** menu, click **Copy**.
   - Press **Ctrl+C** to copy the image.
3. Open the desired Microsoft Windows application (e.g., Microsoft Word).
4. In a new document for the application, press **Ctrl+V** to paste the copied image.

Exporting images as graphic files

Images can be exported in any of three formats: JPEG (.jpg), bitmap (.bmp), or TIFF (.tif). These files can be viewed using any standard image viewer or web browser.

To export images as graphic files:

1. Select the images that you want to export by clicking the image marker in the lower right corner of each image. The marker located at the bottom of each selected image fills in orange.
2. On the **File > Export** menu, click **as Image(s)**. The *Save As* dialog box appears.
3. Select a file format from the **Save as type** drop-down list.
4. Select the Windows directory in which to save the images and enter a filename. If multiple images are selected, the series and image number will be appended to the filename of each image file.

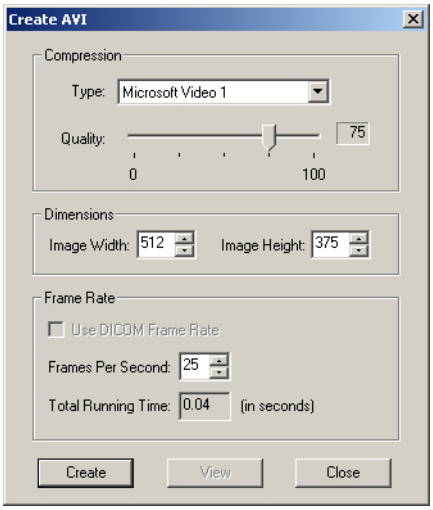
5. Click **Save**.

Exporting images to AVI files

You can export images to an AVI file for viewing with any media player.

To export images to an AVI (video) file:

1. Select the images to be exported by clicking the image marker in the lower right corner of each image. The markers located at the bottom of the selected images fills in orange.
2. On the **File > Export** menu, click **as AVI Video**. The *Create AVI* dialog box appears.



3. Select the compression preferences for **Type** and **Quality**.
4. Specify the **Image Width** and **Image Height** dimensions (the size of the AVI image in screen pixels).
5. Select the frame rate preferences (the number of images or frames that display per second).

Note: The **Total Running Time** value is calculated according to the frame rate.

If a DICOM frame rate has been encoded in the DICOM header, the **Use DICOM Frame Rate** check box is activated. If you select this option, the **Frames Per Second** value will automatically be set according to the frame rate.

6. Once you have set all of your preferences, click **Create**. The *Save As* dialog box appears.
7. Select the directory to which images will be saved and enter a filename. The new AVI file is saved to this location.
8. If you wish to view the AVI image at this point, click **View**.

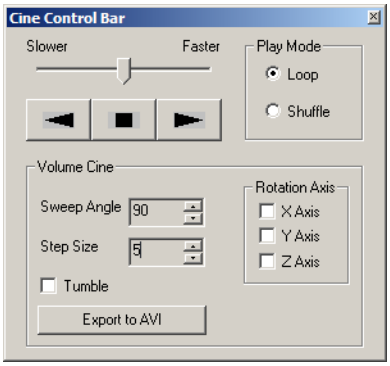
Note: When you open the AVI file in Windows, the movie plays automatically on your computer's default media player.

Exporting volumes to AVI files

You can export a 3D volume to an AVI file and view the resulting cine loop using your default media player.

To export a volume to an AVI (video) file:

1. Select a volume to export.
2. On the **Tools** menu, click **Cine**, or click . The *Cine Control Bar* dialog box appears. The controls in this dialog box allow you to preview and fine-tune the settings for the video file before exporting the volume.



3. Adjust the speed of the cine using the slider.
4. Click to move forward, to move backward, or to stop the preview of the cine.
5. Specify the **Sweep Angle** (degree of rotation) and **Step Size** (degrees per frame).

Note: Select the **Tumble** check box if you want the sweep angle to be 360°.

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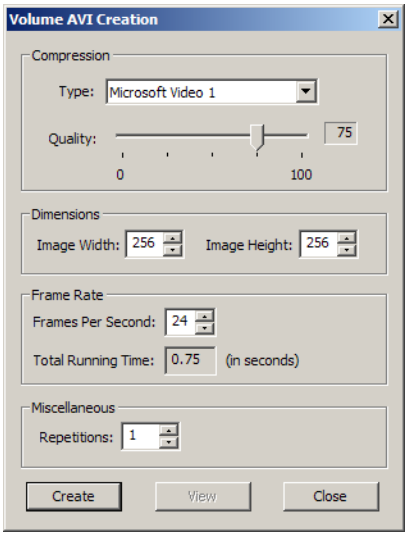
6. Select one or more of the **Rotation Axis** check boxes to rotate the volume about the corresponding axes.
7. Click **Export to AVI**. The *Volume AVI Creation* dialog box appears.



8. Select the compression preferences for **Type** and **Quality**.

9. Specify the **Image Width** and **Image Height** dimensions (size of the AVI image in screen pixels).
10. Select a frame rate (the number of images/frames that display per second).

    Note: The **Total Running Time** value is calculated according to the frame rate.

11. Specify the number of repetitions in the cine.
12. Once all of your preferences are set, click **Create**. The *Save As* dialog box appears.
13. Select the directory to which the volume will be saved and enter a filename. The new AVI file is saved to this location.
14. If you wish to view the AVI volume at this point, click **View**.

Note: When you open the AVI file in Windows, the volume will play automatically on your computer's default media player.

Printing images

You can print images on a regular printer.

To print images to a paper printer:

1. Select the images you want to print by clicking the image marker in the lower right corner of the image. The marker fills in orange.
2. On the **File** menu, click **Print Format**, and select a page layout.

   Tip: You can preview the print job by clicking **Print Preview** on the **File** menu.

3. On the **File** menu, click **Print** to begin printing the images.

Chapter 9: Creating an eFilm Lite CD

This section describes how to create an eFilm Lite CD. This section also includes a description of the DICOMDIR file structure and a listing of the files required to run eFilm Lite.

Note: You must have the ability to create a properly formatted DICOMDIR file set in order to create an eFilm Lite CD. In other words, your process or software must be able to act as a File Set Creator in the General Purpose CD-R Interchange profile (STD-GEN-CD) for both the Basic Directory and Composite Storage & Stand-alone Storage categories. For more information, refer to the DICOM Standard, version 3, Part 11.

To create an eFilm Lite CD:

1. Create the DICOMDIR file set, including the DICOMDIR Basic Directory file, and place them into a temporary directory. See "DICOMDIR directory structure" on page 84 for details on the directory structure of the file set.
2. Copy the Autorun.inf file into the root of the temporary directory.
3. In the temporary directory, create a folder called "eFilmLite" and copy all of the eFilm Lite runtime files into that folder. See "eFilm Lite runtime files" on page 84 for details on the runtime files.
4. If required, in the temporary directory, create a folder called "Other Files" and place any additional files you want copied into that folder.
5. Write the entire temporary directory contents to the root directory of the CD-R.

DICOMDIR directory structure

The general structure of the DICOMDIR file set is as follows:

```
DICOM
    PATIENT0
        STUDY0
            SERIES0
                IMAGE0
                IMAGE1
                IMAGE2
                …
            SERIES1
            SERIES2
            …
        STUDY1
        STUDY2
        …
    PATIENT1
    PATIENT2
    …
DICOMDIR
```

eFilm Lite runtime files

The following table shows a listing of the files required for eFilm Lite to run, and where the files should be located on the CD.

Note: <ROOTDIR> is the root directory of the CD.

Note: Ensure that the Autorun.inf file is in the root directory of the CD <ROOTDIR>.

File Name	File Location on CD	Description
dimpl8.dll	<ROOTDIR>\eFilmLite	Image rendering library
ColorOpacityPresetList.xml	<ROOTDIR>\eFilmLite	Color opacity preset for 3D rendering
ColourMapping.txt	<ROOTDIR>\eFilmLite	Color mapping preset for image fusion
efCmprss.dll	<ROOTDIR>\eFilmLite	Decompression library

File Name	File Location on CD	Description
efCommon.dll	<ROOTDIR>\eFilmLite	Common routines
efKeyImgConnector.dll	<ROOTDIR>\eFilmLite	Key Image Connector Library
efICPDirLt.dll	<ROOTDIR>\eFilmLite	DICOMDIR library
efMC3DICOM.dll	<ROOTDIR>\eFilmLite	MergeCom3 Library
efSheriffLocal.dll	<ROOTDIR>\eFilmLite	eFilm Local Licensing Library
efSheriffRemote.dll	<ROOTDIR>\eFilmLite	eFilm Remote Licensing Library
eFilmD3DX.dll	<ROOTDIR>\eFilmLite	Direct3D Library
efSplash.BMP	<ROOTDIR>\eFilmLite	Splash screen
efTitle.txt	<ROOTDIR>\eFilmLite	Titlebar Caption
eFilmLt.chm	<ROOTDIR>\eFilmLite	Help file
eFilmLt.exe	<ROOTDIR>\eFilmLite	Program executable
efLUTMgr.dll	<ROOTDIR>\eFilmLite	LUT management library
efVolume.dll efVoxel.dll	<ROOTDIR>\eFilmLite	3D rendering library
GrayscaleOpacityPresetList.xml	<ROOTDIR>\eFilmLite	Grayscale opacity preset for 3D rendering
greyscale.xml	<ROOTDIR>\eFilmLite	LUT management setting
LangUtil.dll	<ROOTDIR>\eFilmLite	Language Utility Library
License.rtf	<ROOTDIR>\eFilmLite	End-user eFilm Lite License Agreement.
mc3adv.dll MC3DICOM.dll mrgcom3.msg picn20.dll picn6920.dll	<ROOTDIR>\eFilmLite	DICOM library dependencies
SlsApi.dll	<ROOTDIR>\eFilmLite	Licensing enabler
SlsLocal.dll	<ROOTDIR>\eFilmLite	Local Licensing Library
SlsRemote.dll	<ROOTDIR>\eFilmLite	Remote Licensing Library
SyntaxLists.ini	<ROOTDIR>\eFilmLite	Transfer syntax list
VoxLogo.bmp	<ROOTDIR>\eFilmLite	Logo bitmaps
MFC71.dll MSVCP71.dll MSVCR71.dll	<ROOTDIR>\eFilmLite	Microsoft MFC Runtime
msxml4.dll msxml4a.dll msxml4r.dll OLEacc.dll	<ROOTDIR>\eFilmLite	Required Microsoft distributions
ToolBarProperties.xml	<ROOTDIR>\eFilmLite\Profiles	Toolbar properties for user interface

File Name	File Location on CD	Description
ToolbarConfiguration.xml	`<ROOTDIR>\eFilmLite\Profiles\Default`	Default configuration for toolbars
ToolbarFullCfg.xml	`<ROOTDIR>\eFilmLite\Profiles\Default`	Configuration for all tools visible at once
ToolbarMinCfg.xml	`<ROOTDIR>\eFilmLite\Profiles\Default`	Configuration for minimal set of tools